JUNE, 1950

Vol. 39, No. 6

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The Shop Teachers' Professional Magazine

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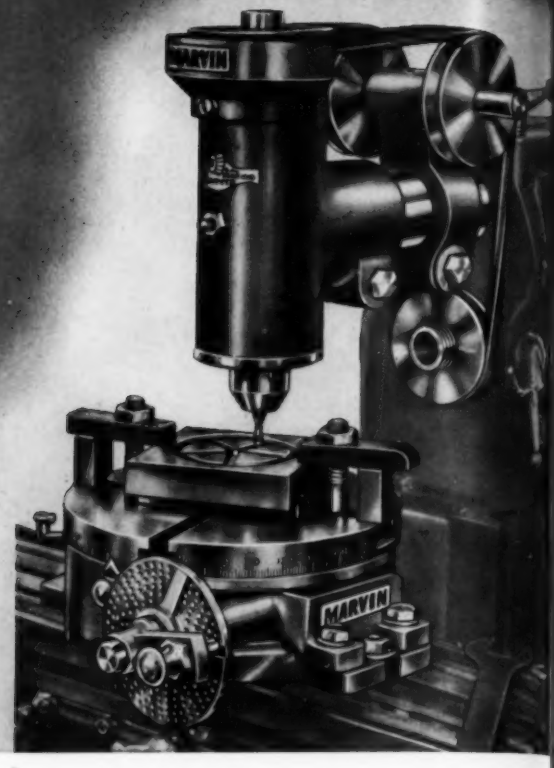

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

VOL. 39 · No. 6

JUNE, 1950

TABLE OF CONTENTS

Increased Responsibilities in an Explosive World ..... *Thomas A. Hippaka* 219
Our Evolving Philosophy of Industrial Arts ..... *Robert A. Hardin* 223
Twenty Years of Shop Guidance in Teachers' Placements ... *William H. Bowers* 226
Some Leaders in Industrial Education ..... *William T. Bawden* 227
Industrial Arts vs. Unsubsidized Vocational Education ..... *Edward K. Hankin* 229
Editorials 232
Psychology of Participation as a Factor in the Conference Method ..... *John A. Buelke* 233

Problems and Projects

Treasure Chest ..... *Walter O. Hayes* 234
Spool Holder ..... *J. Howard Waddell* 236
Turtle Pincushion ..... *Rolland A. Hoehn, Jr.* 237
Wire Measuring and Coil Winding Device ..... *Joseph J. Lukowitz* 238
Plate Hanger ..... *Chris H. Groneman* 240
Teaching Inspection Procedure ..... *Karl F. Kirchhofer* 241
An Improvised Drafting Scale ..... *Howard W. Boekeloo* 246
Electric Lamp ..... *R. M. Hammes* 247
35mm. Enlarger ..... *John Emmel* 249
Template for Drawing Guide Lines for Lettering ..... *Howard W. Boekeloo* 249
The New Rochester G.M. Carburetor for the 1950 Chevrolet .... *Ray F. Kuns* 250
Pictorial Pencil Drawing in Mechanical Drawing ..... *Ernest V. Rhodes* 251
Bench Whirler ..... *Charles H. Scheiner* 252
The Circular-Inch as a Unit of Measure ..... *J. T. Sawhill* 252
How to Produce Minute Changes in Thread Pitch ..... *Howard N. Kay* 253
A Lightweight Auto-Top Carrier ..... *J. Hugh Capron* 254

Association News 4A
Personal News 21A
News Notes 22A
New Publications 24A
Shop Equipment News 28A

Entered January 2, 1914, as Second-Class Mail Matter at Milwaukee, Wis., under Act of March 3, 1879. Copyright, 1950, by the Bruce Publishing Co. Title registered as Trade Mark in U. S. Patent Office, November 25, 1930. Published monthly except during July and August.

Subscription Information. — Subscription price in the United States, Canada, and countries of the Pan-American Union, $3.00 per year, payable in advance. Postage, foreign countries, 50 cents. Copies not over three months old, 35 cents; more than three months, 50 cents.

Discontinuance. — Notice of discontinuance of subscription must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of nonreceipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

Vacation Time

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION hopes that all of its readers will have an enjoyable vacation.

For some this will mean travel, for others touring, for still others attendance at summer school, and, of course, there will be those who will work at various trade and industrial occupations to acquire more practical experience in the subject they are teaching. All of this can be made helpful and enjoyable, but to do so, requires that the proper attitudes be fostered. Educators must always remember what they teach their students, and they must also practice what they preach.

So — good luck!

For Your Information

Until further notice, the table of contents will always be placed on page 3A of this magazine. This will definitely locate it for ready reference.

Some of the news items also will be placed with the advertising section in the front section of our magazine. As most readers will know, up to now this type of material was used only in the back advertising section.

This Month's Cover

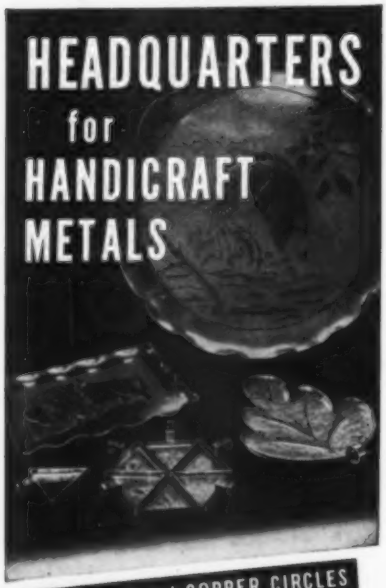
The photograph for the cover of the June, 1950, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION was submitted by Harry A. Goldstein, teacher of photography at the Senior High School, Tucson, Ariz.

It shows students doing overhead welding while in a recumbent position.

Independence Savings Bond Drive

From May 15 to July 4 the Independence Savings Bond Drive campaign to sell U. S. Savings Bonds will be brought to the attention of all Americans.

The schools, of course, will co-operate.



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ASSOCIATION NEWS

COMING CONVENTIONS

May 31–June 3. **Nebraska Vocational Agriculture Association,** at Lincoln Neb. Headquarters, University Library. Secretary, Don Crouser, Columbus, Neb.

June 5–9. **Wyoming Agriculture Teachers Association,** at Jackson, Wyo. Secretary, H. G. Koutz, Albin, Wyo.

June 14–16. **Colorado Vocational Association,** at Estes Park, Colo. Headquarters, Stanley Hotel. Secretary, Edno-Jean Hershey, 837 S. Columbine, Denver 9, Colo.

June 21. **Illinois Association of Vocational Agriculture Teachers,** at Urbana, Ill. Headquarters, 103 Gregory Hall. Secretary, F. M. Parkinson, Lena, Ill.

June 21–23. **Pennsylvania Vocational Association,** at Eagles Mere, Pa. Headquarters, Forrest Inn. Secretary, H. E. Newcomer, Court House, Scranton 3, Pa.

June 26–28. **Annual Conference of Indiana Vocational Agriculture Teachers,** at West Lafayette, Ind. Headquarters, Memorial Union Building, Purdue University. Secretary, H. W. Leonard, A. E. S. Annex, Purdue University, Lafayette, Ind.

June 26–July 1. **California Agriculture Teachers Association,** at San Luis Obispo, Calif. Headquarters, California State Polytechnic College. Secretary, C. A. Cazaly, Delano, Calif.

June 29–July 1. **Association of Teachers of Agriculture of New York,** at Farmingdale, Long Island, N. Y. Headquarters, Agricultural and Technical Institute. Secretary, Ethan Randall, Skaneateles, N. Y.

July 6–8. **Northern California Guidance Association,** at San Francisco, Calif. Headquarters, San Francisco State College. Secretary, E. K. Frederick, 149 Rome St., San Francisco, Calif.

July 10–14. **Minnesota Vocational Agriculture Instructors Association,** at St. Paul, Minn. Headquarters, University Farm, St. Paul. Secretary, Layton C. Hoysler, High School, Faribault, Minn.

July 31–Aug. 3. **New Mexico Association of Future Farmers of America,** at Cloudcroft, N. Mex. Headquarters, 4-H Club Camp near Cloudcroft. Secretary, J. L. Perrin, Box 98, State College, N. Mex.

Sept. 21–23. **National Graphic Arts Education Association,** at Chicago, Ill. Headquarters, Sherman Hotel. Secretary, Fred J. Hartman, Washington, D. C.

Sept. 29–30. **Ohio Vocational Association,** at Columbus, Ohio. Headquarters, Hotels Chittenden and Fort Hayes. Secretary, George L. Brandon, 102 Annex D, 12th Ave., Ohio State University, Columbus 10, Ohio.

AMERICAN INDUSTRIAL ARTS CONVENTION

The 1950 convention of the AIAA was held May 10–13, in Cincinnati, Ohio, at the Netherlands-Plaza Hotel.

At this convention Dr. John R. Ludington spoke on the subject, "A Mid-Century Appraisal of Industrial Arts." He touched upon the controlling philosophy, the present status, and the extent of industrial-arts teaching in our public schools, and pointed out some of the weaknesses and shortcomings of industrial-arts programs.

Other speakers were Chris Groneman, Texas A. & M. College; Gerald Baysinger, Wayne University; Harvey Myer, University of Florida; John Hurley, New York City; Dr. Melton, and O. A. Hankammer, Kansas State College; Dr. Gordon O. Wilber, Oswego, N. Y.; and F. Kenneth Brasted, director of educational department, N.A.M.

The annual dinner meeting of the AIAA was held at 6:30 p.m., Friday, May 12, at the Pavillion Caprice, Netherland Plaza Hotel. Entertainment was provided by choral groups from some of the Cincinnati High Schools. Superintendent Dr. Claude V. Courter of the Cincinnati public schools, and John R. Ludington of the United States Office of Education, were the speakers at the banquet.

Saturday morning there were demonstrations by master teachers and master craftsmen. These were followed by the business meeting.

THE 1950 MICHIGAN INDUSTRIAL EDUCATION CONVENTION

The twenty-second annual convention of the Michigan Industrial Education Society was held in Grand Rapids, April 20, 21, and 22, 1950, with convention headquarters in the Pantlind Hotel. The commercial and school exhibits were in the Grand Rapids Civic Auditorium. The program was under the direction of Joel Lee, immediate past president, Keith Morrison, local chairman, and Walter Scharmack, exhibits manager. The commercial exhibits were outstanding this year. School exhibit arrangements were made by Paul Shilling.

Neil Lotridge, director of vocational education, Highland Park, Mich., was chairman of the afternoon administrators and directors meeting. The topic, "An Authentic Appraisal of High School Youth," was presented by Wilbur Brookover of Michigan State College. This talk was followed by a panel discussion the members of which were William Stirton, William H. Roe, and Glenn E. Smith.

The Thursday evening meeting of supervisors, superintendents, principals, and directors on vocational education, was presided over by Ralph Wenrich, assistant superintendent of public instruction in charge of vocational education, Lansing, Mich. Two panels were used for the discussion of the topic, "Equal Opportunities for All Michigan Youth." One panel was used to bring out the factors interfering with the equality of opportunity — the second panel was used to prescribe the remedies which might be applied to remove the obstacles standing in the way of educators providing equal opportunity.

At the convention breakfast on Friday, Charles Kemp, vice-president of the M.I.E.S., acted as toastmaster, and L. P. Cushman, Owosso, Mich., gave an inspiring talk on "Industrial Arts Instructors — Humans?"

At the annual business meeting and general session at 9:30 Friday morning, a new constitution for the M.I.E.S. was presented by the Constitution Revision Committee. It was adopted unanimously.

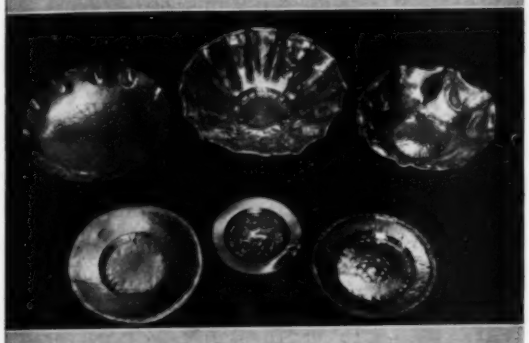
The Friday noon period was devoted to alumni and fraternity luncheons.

The Town Hall meeting was led by Deyo Fox, who was substituting in the absence of Earl Bedell. The discussion centered around the topic, "How Can the Michigan Industrial Education Society Maintain Its Leadership Position in Michigan?"

A large attendance was reported at all the division meetings held at 2:45 p.m. Dr. Fred Strickler, dean of Bennett College, talked on

(Continued on page 6A)

Dixon Tools helped make this prize-winning entry for students of Battin High School, Elizabeth, N. J., Mr. H. Schopp, Instructor.



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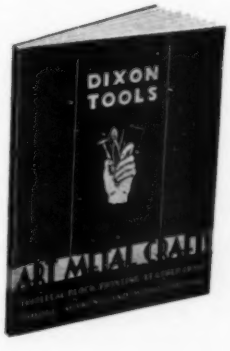
School Boards and Teachers interested in Art Metal Crafts, Wood Carving, Leathercraft, Linoleum Block Cutting and Printing will find the Dixon Catalog very valuable. It displays complete lines of tools, supplies information regarding tool uses and methods. It will be sent free to school authorities and teachers. Please identify your school connection. Individual Craftsmen may purchase the catalogue for $1.00.



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ASSOCIATION NEWS

(Continued from page 4A)

"Teaching Aids and Devices for Industrial Arts." The subject, "How Can Trade and Industrial Education Best Serve the Needs of Labor and Industry?" was discussed at the trade and industry division meeting. This discussion consisted of a report of agreements reached at the Haven Hill conferences by labor, management, and public school officials. The Industrial Arts Teacher Trainers met as a separate division for the first time this year. John A. Fuzak of Michigan State College was chairman of this meeting.

A special feature of the convention was an exhibits booth sponsored by the Michigan Industrial Education Society displaying certified projects and making drawings available of any or all of the projects that were desired by members visiting this booth. On Friday this booth sold 1500 blueprints. There were times when it was not possible to get near this booth due to a crowd surrounding it.

At the banquet honorary life memberships were presented by Maurice C. Overholt, executive secretary-treasurer of the M.I.E.S., to Harry Burnham, past president of M.I.E.S., and now supervisor of student training at A-C Spark Plug division, General Motors, and to Andrew Althouse, also a past president of M.I.E.S., and supervisor of industrial education in the Detroit schools. Dr. Lee Thurston presented Earl H. Babcock, superintendent of schools, Grand Haven, Mich., with an honorary life membership. This is the first superintendent to be so honored by this society. Norman Reckling presented the Master Teacher Award plaque to Estell Curry of the Detroit public schools. Dr. Wynand Wichers, vice-president of Western Michigan College, was toastmaster for the banquet. The principal address was given by Dr. Alfred P. Haake, mayor of Park Ridge, Ill. His topic was "A Time for Decision."

A new feature on the Saturday morning program was a past president's breakfast. Joel W. Lee was chairman of this event. This will continue as a feature on future programs since the past presidents serve as an advisory committee to the society.

Dr. Joe Giachino, associate director of vocational-industrial education, Western Michigan College, Kalamazoo, was chairman of the group round tables. The first round-table discussion took up the topic, "The Role of Industrial Education in a Life Adjustment Education Program." Bill Hawkins, director of educational research, American Technical Society, Chicago, Ill., and Dr. Ralph Gallington, professor of industrial-arts education, Pennsylvania State College, were the speakers on this program. The second round table at 10:30 a.m., discussed the topic, "What Can Be Done to Improve Industrial Arts Courses?" Paul Shilling, Arthur L. Reagh, Neil L. Schoenhals, William T. Sargent, C. E. Highlen, Thomas P. Garrity, Ralph Gallington, and Dr. E. R. Estabrooke served on this panel.

The convention closed with a Ship's luncheon in the Pantlind Hotel. The Reverend Robert O. Richards, pastor, Bethany Methodist Church, Detroit, Mich., spoke on the topic, "The Education of an Immigrant." The Ship's program was also held during the luncheon hour with Wesley Stephens, McKnight and McKnight, as deck officer.

The following officers were elected for the year 1950–51: Charles Kemp, Flint, Mich., president; Fred Harreen, St. Joseph, Mich., vice-president; Maurice C. Overholt, Grand Haven, Mich., will continue as executive secretary; and Walter Schermack, teacher, East Grand Rapids public schools, will continue as exhibits manager.

The 1951 convention will be held at Grand Rapids, April 19, 20, and 21. — *Maurice C. Overholt, Executive Secretary-Treasurer.*

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EXCLUSIVE 100° ANGLE DRIVE makes this new No. 2120 Buffing and Sanding Attachment easier to use. Perfect for any ¼" drill. Complete with 5-inch rubber pad, 2 sanding discs and lambswool polishing bonnet.

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MORE POWER — LESS COST! $35.00 This new No. 912 ½" Drill is a real standout. Bores ½" holes easily in steel without stalling or overheating — yet weighs only 8 lbs. Jacobs No. 33B Key Chuck.

RUGGED AND HUSKY That's the new Millers Falls No. 2912 Bench Stand — 26 solid pounds of precision construction. Converts either No. 912 or No. 914 Drill into powerful drill press for accurate work.

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THE INDUSTRIAL EDUCATOR'S SUPERVISORY CONFERENCE

Fred Strickler
Dean, Bennett College
Bradley University
Peoria, Ill.

The second meeting of the Industrial Educator's Supervisory Conference is scheduled for June 29 through July 1 at Bradley University and Caterpillar Tractor Company in Peoria, Ill. It is hoped that a full membership of 65 bona fide supervisors will be present for this meeting. Persons planning to attend should send their suggestions for the program either to M. J. Ruley, director of industrial arts and vocational education, Tulsa, Okla., chairman; or to Fred Strickler, Bradley University, executive secretary of the Conference.

In present-day education it is taken for granted that persons holding key positions are studying their jobs and are continually trying to increase the effectiveness of their educational services. This is particularly true of workers in industrial education. They subscribe to professional magazines, take graduate work and attend conventions. They try to "keep up" and, if conditions are at all favorable, make some contribution to their field. Industrial work is a relatively new addition to school programs and presents both a challenge and an opportunity to keen students of education.

It may seem to some educators that there are too many local, state, and national organizations in existence now to warrant the establishment of others. The American Vocational Association is a national organization that serves *all* workers in industrial education. At its annual convention it has general meetings as well as sectional meetings that serve special groups. General conventions bring workers in related fields together, widen contacts, furnish stimulation and suggestion and broaden horizons. The American Industrial Arts

(Continued on page 14A)

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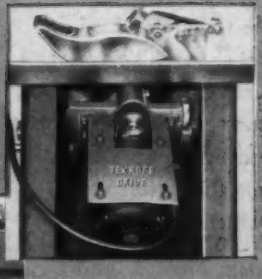
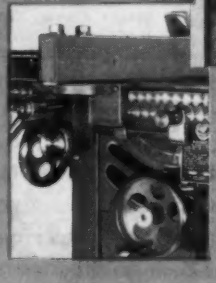
View shows triple "V" belt drive bearing housing and machined ways of elevating unit. Saw guard can be removed quickly by hand screw.





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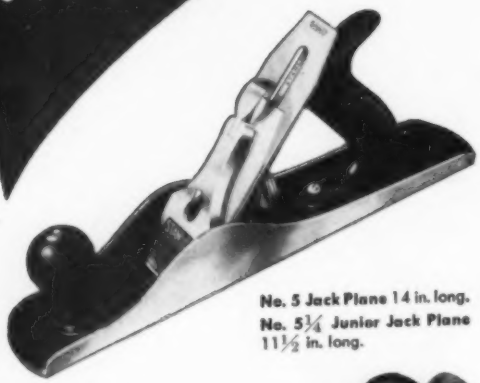

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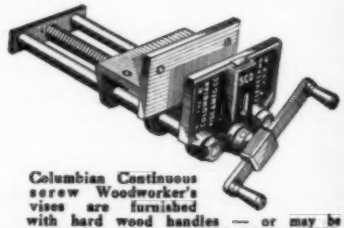

Columbian Continuous screw Woodworker's vises are furnished with hard wood handles — or may be equipped with ADJUSTABLE STEEL HANDLES, as above, to eliminate handle breakage, speed operation and provide extra leverage.

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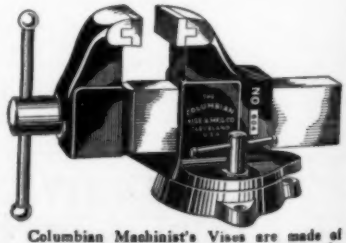

Columbian Machinist's Vises are made of malleable iron castings, guaranteed unbreakable, and designed to provide accurate, dependable equipment for school and industrial shops. All standard types.

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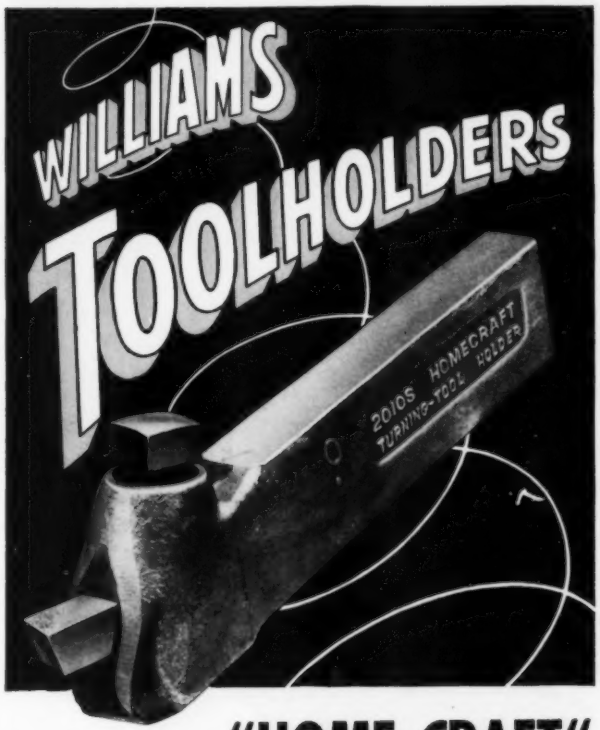

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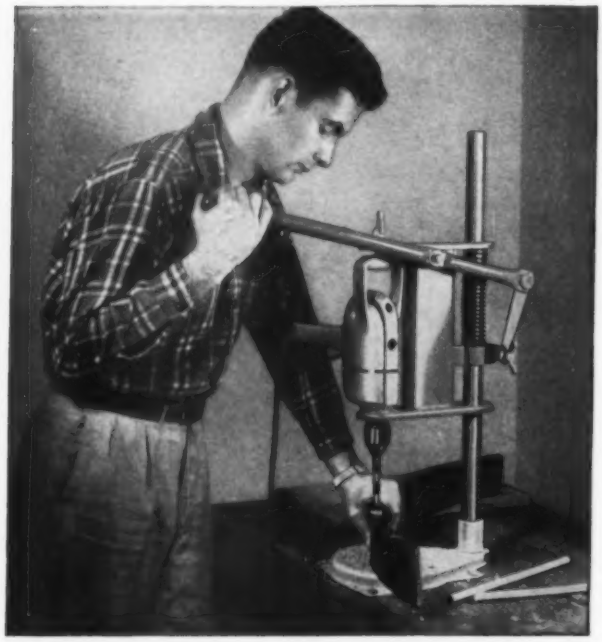

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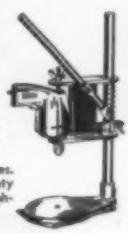

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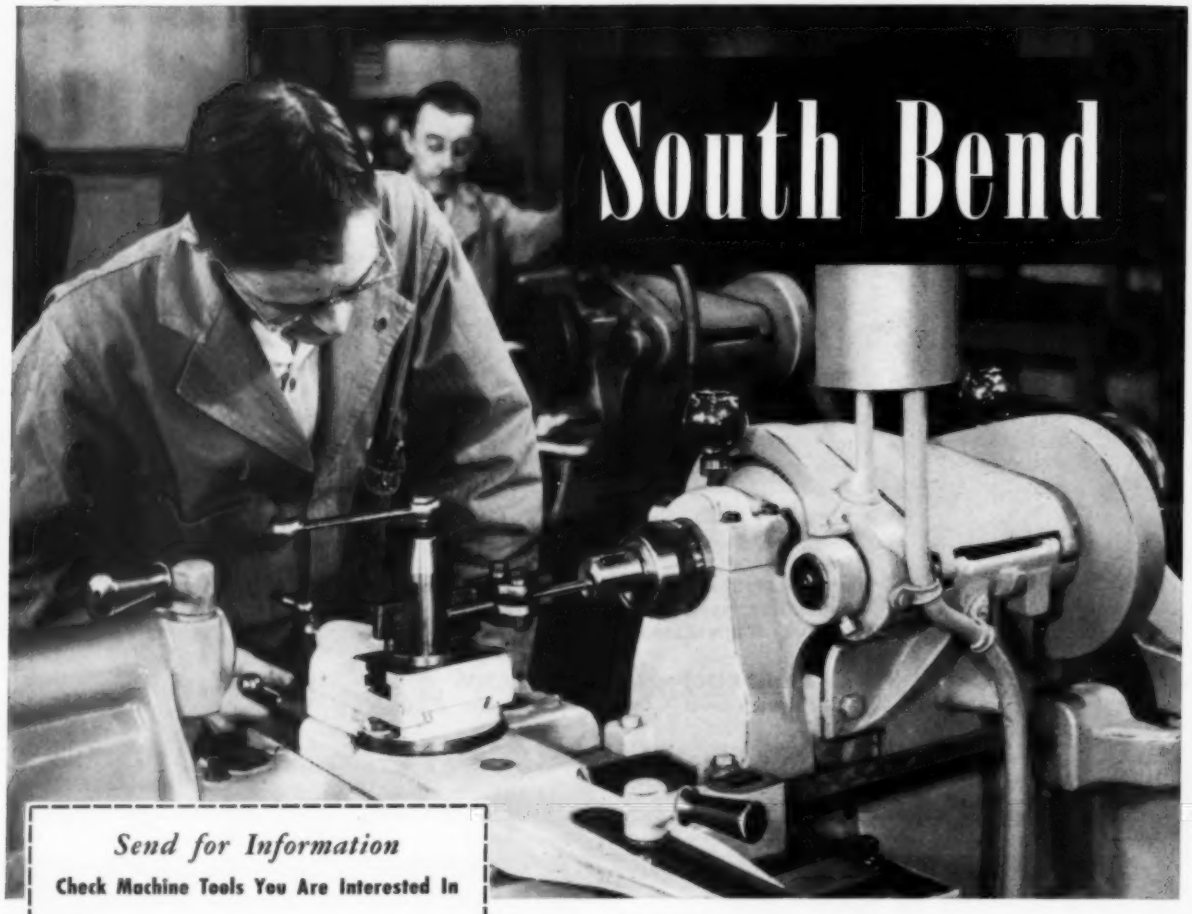

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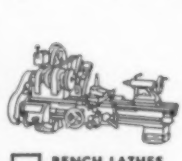

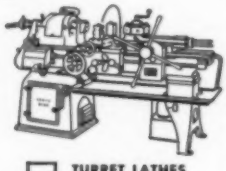

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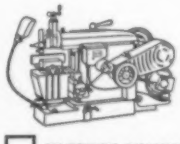

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Increased Responsibilities In An Explosive World

THOMAS A. HIPPAKA*
Professor of Industrial Education
Iowa State College
Ames, Iowa

For the first time in human history, we now have the power to destroy ourselves, as well as the world which our Maker entrusted to us. The diabolical instruments of destruction now possessed by the world powers stagger the human imagination. In the words of Dr. Harold Urey:

> The world has become much smaller and much more explosive. Now we are crowded together into a single house. Beneath the floor of our house there is a time bomb ticking away.

It is a world replete with seemingly insurmountable obstacles, largely of man's own making. Under the pending threat of the hydrogen bomb, three quarters of the world's inhabitants go to bed hungry every night. Added to this grave dilemma, each morning for breakfast there are 55,000 more mouths to feed than there were the day before. In the face of hunger and even starvation, the population of the world is increasing at the staggering rate of 20,000,000 each year. Far too many people are inadequately clothed, fed and housed in a world too busy fighting a cold war to alleviate such sufferings. What is more, a world which sadly needs the know-how of production in peaceful pursuits is now engaged in an unprecedented armament race which can result in a shooting war.

Present-Day Conditions

Our world today is not a bed of roses. It is not a place where indifferent people live soft lives and expect to enjoy the liberty bequeathed us by our forefathers. We need to realize that there is no guaranteed security in this world for anyone, and that it is imperative to learn to live with the risks as they exist today. The world demands liberty loving people who combine goodness with moral toughness; men and women who are at their best when "the chips are down"; competitors with nerves of steel, who do not crack under the strain of the times.

Hazardous as this world is, it is nevertheless a challenging one. Never before has life offered greater opportunity for service; seldom has humanity "played for higher stakes."

World economic imbalance is one of the inevitable aftermaths of war. Naturally, there was no escaping such economic dislocation after World War II. If anything, the present world imbalance has reached a new low. One of the very significant causes of the present world economic condition has been the astounding productive ability of the United States. Russia is producing; how much, we do not know. We do know that Russia has bled Eastern Germany, Korea, Manchuria, Poland, Czechoslovakia, Romania, and Finland. She marched her armies into Latvia, Lithuania, and Estonia and conveniently neglected to have them march out. England's economic plight further complicates matters; in fact, her financial weakness reflects the economic instability of Europe. The gravity of the situation in the Near East, as well as the Far East, only adds to our economic difficulties.

Free peoples throughout the world must become allies in the true sense of the word. They need to present a united front, thereby building a stable economy for all of the democracies. We in the United States must close the wide gap between what we do for others and what we allow them to do for us; imports and exports must come nearer to being in balance. In searching for a remedy to the world's imbalance, we might well heed the words of Paul Hoffman: "If we would sell, we must buy."

The conquest of ignorance still remains one of our paramount tasks; a challenging frontier worthy of our very best efforts. Two thirds of the world's population cannot read or write. Of these illiterates, seventy million over 15 years of age are to be found in North, Central, and South America, fed from a pool of approximately 19,000,000 youth without schools. Eighty-seven per cent of the people of India cannot read or write any language.

Civilization and Ignorance

Civilization, as we want to know it, is impossible where people are forced to remain in ignorance. When we expect civilization to thrive in a state of ignorance, we are expecting something that never was, and never will be. Throughout world history, where there has been ignorance, there has been slavery. And ignorant people can never remain a free people.

Ignorance and the power to reason in terms of world peace do not go together. The UNESCO preamble makes crystal clear the key to peace in these words:

> Since wars begin in the minds of men it is in the minds of men that the defenses of peace must be constructed.

Man's greatest task today is not conquering nature; it is the conquest of ignorance, greed, and selfishness. Greed and selfishness contribute to our very ignorance, and largely because of our ignorance, we are greedy and selfish. If this world of ours can spend billions for war, it can and must spend billions for education, if there is to be any world at all. As the greater part of the world's population learns to read, proper printed materials must reach these people at the appropriate time, all of which will tend to determine

*Dr. Thomas A. Hippaka, whose Finnish name is Toivo Augusti Hüpakka, returned to America from Finland, when a boy, to escape the cruelty of the Czar of Russia.

whether they become communists or followers of the democratic way of life. Apparently we have yet to learn that even a hydrogen bomb cannot destroy an idea; only, a better idea can, when people are able to evaluate and to implement its true meaning.

Throughout the world, the science of human relationships must become the keystone of the arch of education. If we do not learn to live together, we will ultimately perish. Human understanding is basic to world peace. Successful living on this planet needs to be measured in terms of decency in human relationships, and not the dollar sign, peoples subjugated, or territory conquered. When enough people understand each other, there will be no more war. They will make their good private opinion felt as public opinion, thereby insisting that no mere handful of wicked, self-seeking world gangsters will again gain sufficient power to plunge the world into a war of human annihilation. Dr. J. Robert Oppenheimer, writing as a scientist, places an extremely appropriate premium upon human understanding when he says:

> If we are to have a future in which all people are to live together and to work together in the same world, at peace, men must be able to understand one another. They must be able to communicate with each other without barriers, without coercion, and without fear. We must have an open world, and we must have men with open minds. Free and open minds are the precondition for resolving in the world of practice the basic issues that science uncovers and creates. They are the precondition of democracy. They are the precondition of a lasting peace.

Of utmost importance to freedom loving people everywhere is the honorable recapturing and preservation of human liberty, without a shooting war. The dropping of bombs is not the answer. Shooting wars are never won by anyone; victor and vanquished alike lose and pay dearly for every world holocaust. Working at peace is a backbreaking job, which must go on for years with continued sacrifices the world over.

Not only are we concerned with the possession of liberty itself; we are tremendously concerned with how it is to be preserved in the future. Reason must replace armaments in this matter. For too long a time, the liberty enjoyed by men has been won largely through force of arms. It is about time that the world took seriously the words of Abraham Lincoln which were uttered many years ago:

> It has been said of the world's history hitherto that might makes right. It is for us and for our time to reverse the maxim and to say that right makes might.

Today's Crucial Task

Our crucial task today is not to win World War III; it is to prevent such a war, honorably. When justice is ultimately elevated to its rightful status in world affairs, wars will have become an outmoded means of settling our disputes. When enough morally responsible nations insist that right must make might, Benjamin Franklin's admonition will no longer be necessary:

> Justice is as strictly due between neighbor nations as between neighbor citizens. A highwayman is as much a robber when he plunders in a gang as when single; and a nation that makes an unjust war is only a great gang.

Member nations of the United Nations have dedicated themselves to the prevention of World War III. They have committed themselves to the attainment of a goal which calls for "saving succeeding generations from the scourge of war." Through world government, the great dream of Woodrow Wilson and the "One World" concept of Wendell Willkie can become a reality. Some there are who find the United Nations fumbling and slow; others call it a debating society. Without a world government humanity cannot survive, and world government must come through the United Nations. World government through the United Nations will become a reality when enough of the world's population insists upon having it. In the words of Trygvie Lie:

> The United Nations is no stronger than the collective will of the nations that support it. Of itself it can do nothing . . . it can be used and developed in the light of its activities and experience to the untold benefit of mankind or it can be discarded and broken.

The free people of this world need to realize their tremendous potentialities for good. When more millions of us throughout the world bring toughness as well as goodness to the solution of our problems, they will eventually yield to our efforts.

Although human liberty is still being lost in some quarters of the globe, there are some encouraging signs, here and there, throughout the world. Late in 1949, Norway voted out the last communist from her Parliament. When President Juho Paasikivi of Finland was asked about the possibilities of preserving freedom in his country, his brief but pointed reply was: "We are very much alive and we have no intention of dying."

From Yugoslavia comes a peculiar kind of encouragement. For the first time, the communistic regime of a small country is successfully opposing the hierarchy of a larger communistic state. The situation has all of the potentialities of a shooting war. Meanwhile, Joe Stalin and his associates are being put to a real test by Marshall Tito who, ironically enough, was trained under the tutelage of the Kremlin.

It is imperative that good people eliminate the bad people from the governments of the world if humanity is to be free in a peaceful world. As world citizens we have the right to demand goodness and moral courage from our global leaders. The world desperately needs leadership with the integrity so well described by Woodrow Wilson:

> The most patriotic man in the world is the man who goes in the right direction even though one half of the world is against him.

Responsibilities of Leaders and Followers

We as followers have some very grave responsibilities if we expect our world to have such leadership. Our leaders look to us for moral support, and rightfully so. Subversive forces are constantly at work on our leadership. Night and day such forces grind away; while too many right-thinking people continue to think good thoughts, but do not act. Time and again, we have witnessed the scene in our own country, as well as in world affairs, where honest men resigned their posts because they could not withstand the pressures of evil men. These pressures have killed many valuable men in line of duty. Whenever good men resign or die under such circumstances, democracy loses ground. We, as intelligent followers, must not only elect good and tough leaders; we must let them know often enough that they have our wholehearted support, our approval and even our praise, as they perform their arduous duties.

Democracy, Our Full-Time Job

> What the outside world is more eager to know is whether we are capable of coping with the sociological and spiritual strains placed upon us by all this abundance. It is eager to know whether we are going to be able to retain, in a mechanized environment, the individuality, the emotional tone and the civic vigor of earlier generations of Americans. — George F. Kennan, *Reader's Digest*, March, 1950.

When we recall that patriots like George Washington, Thomas Jefferson, Patrick Henry, Alexander Hamilton, Thomas Paine, and Benjamin Franklin staked

their all on the altar of freedom, is it any wonder that the outside world has some doubts about our integrity? Peace with honor was an imperative with them. As far as they were concerned, peace that did not guarantee freedom was of no value to them.

The greatest contribution which we can make to the welfare of mankind everywhere is to make our own democracy work. Our international relations can well begin at home. People throughout the world are watching us; our success or failure in our own democracy will have far-reaching consequences. As we go about this all-important business of making our democracy function, we need to heed the well-chosen words of the Lowly Carpenter of Nazareth: "Judge not that ye be not judged."

Before we criticize the other nations of the world we need to put our own house in order. If we are to succeed in this endeavor, each one of us must make democracy a personal cause and become real missionaries of democracy. In a democracy, man is the real problem, and each one of us must assume responsibility for his own acts. In the words of an unknown author this can best be done when we realize fully that:

> The great privilege is given to all to develop strength of character, to lead clean lives, to render diligent service, to help others, and to be a loyal citizen of a republic and obedient to its laws.

Could it be that this unknown author feared the very condition which Will Durant now vehemently proclaims in these words:

> The moral life of our people has sunk to a level unprecedented in American history.

Since freedom has become a luxury in too many places on the face of this earth, we would do well to take stock of our freedom here in America. Are we taking our freedom for granted? What is freedom, anyway? Hazel Parker simply puts freedom in these terms, commonplace as they may seem to us, but certainly they are uncommon to the millions throughout the world who do not have them:

> Freedom is a man lifting a gate latch at dusk and sitting for a while on the porch, smoking his pipe, before he goes to bed.
>
> It is the violence of an argument outside an election poll; it is the righteous anger of the pulpits.
>
> It is the warm laughter of a girl on a park bench.
>
> It is the rush of a train over the continent, and unafraid faces of people looking out of the windows.
>
> It is Westbrook Pegler telling Roosevelt how to raise his children; it is Roosevelt letting them raise themselves.
>
> It is Lindbergh's appeasing voice raised above a thousand hisses.
>
> It is Dorothy Thompson asking for war; it is General Hugh Johnson asking her to keep quiet.
>
> It is you and I trying to remember the words to "The Star Spangled Banner."
>
> It is the sea breaking on wide sands somewhere, and the shoulders of a mountain supporting the sky.
>
> It is the air you fill your lungs with, and the dirt that is your garden.
>
> It is a man cursing the cops.
>
> It is the absence of apprehension at the sound of approaching footsteps outside your closed door.
>
> It is your hot resentment of intrigue, the tilt of your chin and the tightening of your lips sometimes.
>
> It is all the things you and I do and want to keep on doing.
>
> It is all the things you and I feel and cannot help feeling.

Democracy and Education

Although the very life of a democracy depends upon an educated citizenry, illiteracy is appalling in America. There are nearly 9,000,000 adults in the United States who have four or fewer years of schooling, and who might well be considered "functionally illiterate." Illiterates total 2,838,000 in our country, of whom only 200,000 are enrolled in literacy classes. The typical community of five hundred people in the United States has enough adult illiterates to form one literacy class. Of the 13,000,000 foreign-born inhabitants of the United States, more than 8 per cent do not speak English. Adult education must receive the wholehearted support of laymen as well as educators if the matter of our illiteracy is to be remedied.

The unparalleled increase in school population in the face of obsolete and inadequate school buildings, too often in inadequately staffed, presents a very grave problem. Unfortunately, school boards and school administrators accepted the erroneous estimates of the late thirties and the early forties that school enrollments would continue to drop. The year 1947 proved to be a record one with 3,876,000 births. The mortality rate for infants reached a new low of 31.8 deaths per 1000 live births in 1948 when 3,700,000 births were recorded. From April, 1940, to April, 1947, our white population increased 7.5 per cent, while the nonwhite population rose from 13,454,405 to 15,017,000, an increase of 11.6 per cent. Needless to say, there are too many communities throughout the country which neglected to foresee and to provide for this school population dilemma. Now they must wrestle with this serious problem when labor and building materials are still at an unprecedented high.

No one can seriously deny that our economy at home is in grave jeopardy of losing its stability. In 1919, after we had fought World War I, our total national debt was $25,482,000,000. By 1930 we had reduced this amount to $16,185,000,000. Our debt reached the all-time high of $269,422,000,000 on July 1, 1946. It is estimated that with the 1949 deficit of $1,811,000,000, the 1950 deficit of $5,533,000,000, and the proposed deficit of $5,133,000,000 for 1951 that our total debt will amount to the staggering sum of $263,800,000,000. Our free economy continues to be seriously endangered by a cold war which we are forced to fight with Russia. Nothing would please Stalin more than to see us spend ourselves into financial bankruptcy. It is estimated that Russia is spending 18 per cent of its national income for this purpose, a sum ranging from $40,000,000,000 to $50,000,000,000 yearly. Approximately $30,000,000,000 of our $42,000,000,000 yearly budget is being spent for past, present, and future hot and cold wars. Our wartime army of 11,000,000 men has been reduced to 636,000 men. We plan to spend $13,000,000,000 for military purposes in 1951, hoping that our advanced science and technology will make it unnecessary to retain millions of men in our armed forces. Only our courage, imagination, intelligence, industry, and thrift will keep us economically solvent.

Important as are the physical, mental, moral, emotional, scientific, technological, economic, political, and the military strengths of our nation, any educative process which neglects the spiritual development of people is never complete. Without spiritual development in our total educative process there can be no moral ideals, and without these moral ideals, civilization, as we would wish to know it, will never become a reality. Rector Magnificus Arthur Langfors appropriately magnified the importance of spiritual education when he formulated these goals for the University of Helsinki:

> This university belongs to the whole Finnish people; it is the spiritual center whose primary duty it is to foster those moral ideals without which there can be no civilization . . . the ideals of freedom of thought and freedom of conscience we want to bequeath as an inheritance to the youth of Finland.

The Spirit of Things vs. the Things of the Spirit

For too long a time our industrial age has cultivated the spirit of things and

minimized unduly the things of the spirit. Since July 31, 1790, the United States patent office has issued 2,500,000 patents; the first going to Samuel Hopkins of Vermont for a method of "making pot and pearl ashes," generally known as potash; and appropriately enough for our explosive age, patent number 2,500,000 was awarded to Francis M. Lampert of Pennsylvania for a quick-acting mechanism for latching doors, adaptable to atomic shelters. Our creative imagination has literally known no bounds, and may our technology always be the most advanced in the world. As we have developed this unbelievable technology of ours, we have shamefully neglected the development of an appropriate sense of values, a sense of direction and a steadiness of control. No longer is the atomic bomb in the sole possession of the United States. Only serious attention to the things of the spirit will give us the sense of direction, and the steadiness of control which we so desperately need, if we are to prevent world annihilation. Woodrow Wilson cautioned us well in words which must be heeded, for the hourglass may be running out:

> Our civilization cannot survive materially unless it is redeemed spiritually. It can be saved only by becoming permeated by the spirit of Christ and being made free and happy by the practices which spring out of that spirit. Only thus can discontent be driven out and all shadows be lifted from the road ahead.

Democracy has become a full-time job for all of us. Life on this earth has become a prolonged struggle between the communistic way of life and life as we know it in a free country where human dignity still prevails. Being a full-time job, this business of democracy will always demand well-integrated participants. Surely it is the primary task of our schools to help produce such people; citizens who possess good physical and mental health; who have character; who are emotionally stable; who seek to understand their fellow men in order that they can get along with them; who have vocational competence; and who practice spiritual living. Making democracy work means that:

1. Real prosperity can come only through increased production, resulting from hard work. When we allow our youth to grow up without any work experience, we are doing them a very grave injustice. In the words of General Dwight D. Eisenhower:

> Anyone who in his early years was not forced to earn his living, at least in part, is badly handicapped . . . anyone who has had the priceless privilege of working because he had to, and not as a game, has begun to achieve the integration of himself with society.

2. Labor, industry, the consumer, and the government must be co-operative partners in a common enterprise.

3. The calamity will be of our own making if our economy goes into a tailspin.

4. Each one of us must always assume responsibility for our own acts.

5. Free, competitive enterprise which demands imagination, initiative, and integrity, should be duly encouraged and recognized as a vital factor in our way of life. Abraham Lincoln addressed himself well to this important phase of our living when he said:

> You cannot bring about prosperity by discouraging thrift.
>
> You cannot strengthen the weak by weakening the strong.
>
> You cannot help the wage earner by pulling down the wage payer.
>
> You cannot build character and courage by taking away a man's initiative and independence.
>
> You cannot help men permanently by doing for them what they could and should do for themselves.

6. No individual or group of individuals has a right to paralyze the country.

7. We must accustom ourselves to tensions of various kinds.

8. Concerted public opinion will move anything, for aroused public opinion is more powerful than the atomic bomb.

9. Good private opinion must become public opinion if it is to be of real value.

10. We must tolerate disagreement and opposition, always discussing our differences dispassionately.

11. Goodness must be accompanied by moral toughness.

12. We need to do voluntarily what we ought, thereby making the least government the best government.

13. As citizens in a democracy, it is necessary for us to realize that democracy is not only the youngest form of government in the world; it is also the most difficult form of government on this earth.

14. We must purge ourselves of racial, religious, economic, and political prejudices.

15. "My country right or wrong" does not lead to right answers.

16. Self-discipline, discipline from within, is an imperative.

17. For every stitch of freedom there is always a corresponding sense of responsibility. Only responsible people can remain a free people. We must be certain that we understand the institutions which we have created, and that we are their masters and not their slaves. Each governmental proposal must be carefully weighed by every citizen in terms of its effect upon his freedom. Responsible people are devoid of apathy and indifference, for they know that indifference can become our greatest curse. In the words of General Dwight D. Eisenhower:

> Our American heritage is threatened as much by our own indifference, as it is by the most unscrupulous office seeker, or by the most powerful foreign threat.

18. We are the government; we have no one to blame but ourselves if conditions are not to our liking; it is our money that we are spending.

19. We recognize our responsibilities as well as our rights and privileges. Much too often we are more concerned about what we should get from our government than what we can give to it.

20. A good educational system, really

View of machine shop, Senior High School, Richmond, Ind.

commensurate with our ability to provide, is an absolute essential to our very existence.

21. The natural resources which we are wasting, and our stock piles of various strategic materials which are woefully low, were left to us in trust by our Creator.

22. If we are to remain a free people, freedom must stand foremost in our sense of values. It becomes paramount that we heed W. Somerset Maugham's warnings when he said:

> If a nation values anything more than freedom, it will lose its freedom; and if it is comfort or money that it values more, it will lose that too.

23. If we vote only as Swedes, Congregationalists, war veterans, or truck drivers, America will suffer. Failure to vote is inexcusable, and only 45 per cent of us voted in the presidential election of 1948.

24. We need to begin living within our means; deficit spending is not the answer to our economic ills.

25. Men must remain free to worship as they please, and spiritual living is indispensable to the life of a democracy.

26. We must learn to think for ourselves on the basis of facts. When we allow someone else to do our thinking for us, our very survival is at stake. Dr. Conant could very well have had this in mind when he wrote:

> Think for yourselves! Absorb knowledge wherever possible, and listen to the opinions of those more experienced than yourselves, but don't let anyone do your thinking for you.

27. We must do everything in our power to extend the blessings of democracy to the other peoples of the world. The sending of raw, as well as manufactured materials, to other lands, is not the complete answer. Billions of dollars have gone to other countries, and that is as it apparently had to be. However, we need to think in terms of other essential values as well, for our responsibilities have increased tremendously in a moral sense. People throughout the world crave for and need something more than dollars, tractors, and armaments, important as these items are. They want to know where we stand on the important world issues. And still, in 1949 when we were spending $30,000,000 on cosmetics, we spent only $29,000,000 for the Voice of America, which someone has recently labeled the whisper of America. We must be aggressively right in the eyes of the world, and there must be much of moral, spiritual, and human strength in our actions. Never in the history of the world have the words of Michael Spencer Free struck as receptive a chord as they do today:

> 'Tis the human touch in the world that counts —
> The touch of your hand and mine,
> Which means far more to the aching heart
> Than shelter and bread and wine;
> For shelter is gone when the night is o'er
> And bread lasts only a day
> But the touch of the hand and the sound of the voice
> Sing on in the soul, always.

Our Evolving Philosophy of Industrial Arts

ROBERT A. HARDIN
Chairman, Department of Industrial Education
University of Oklahoma
Norman, Okla.

(Continued from page 182 of the May, 1950, issue)

Evolving Philosophies

Philosophies develop slowly, and content and method occasionally lag far behind philosophy, so it is not surprising that some of us made a lot of joints when we were in school, nor, considering the state of industrial development there, is it amazing that woodworking usually was the only course taught. Production of automobiles, radios, and the multitude of household accessories had not yet entered the production stage so there was not then so great a reason for teaching courses in metalwork, electricity, sheet metal, plastics, etc., as there is now. We find philosophy and content continually being modified by the influence of industrial and scientific developments. What the effect of the ability of man to produce new elements will have on our philosophy in the future, the human mind may speculate but have little of true comprehension.

The period 1880–1900 is recognized as one in which many of the principles and practices now generally accepted received their first impetus. At first the tendency was all toward setting up schools for manual training separate from traditional academic schools. With the growth of the manual training movement and its increasing popularity, however, there was a growing tendency to enrich the course of instruction so as to provide for individual differences for a larger number of students. This tendency to enrich the offerings brought about important changes in two directions: (1) toward a complete integration with the academic high school, and (2) toward a richer technical curriculum which found a definite place in the larger metropolitan centers.

Another practice begun during this period was the use of instruction sheets. All industrial-arts teachers are familiar with them now and they are published in several forms. The first man to use them appears to have been W. F. Decker who was an instructor in manual training in Minneapolis about the year 1887. Mr. Decker was formerly an engineering professor, and perhaps not having the inhibitions and habits of a manual training teacher, was years ahead of his time in developing these valuable teaching aids. Each of his sheets contained a working drawing of the job to be done, followed by printed directions for proceeding with the work. Only during the past 15 or 20 years has there been any widespread adoption of instruction sheets. Their use was given an impetus through contributions by Brown and Tustison and by Robert W. Selvidge.

Near the end of the past decade of the

nineteenth century we see the beginning of a shift of emphasis from the development of skills in shop processes to broader aspects of learning and living. Before this change took place statements like the following appeared: "The first piece the pupil is required to make is a block of given dimensions, *which must be* perfectly flat on each face with all the angles right angles."[22] By this shift of emphasis it is not meant that skills were neglected but that we began to see other values which heretofore had been obscure.

By this time the social philosophy of John Dewey was making itself felt, and curiously enough, we derived much of our philosophy of method from his philosophy as it applied to the elementary school and kindergarten. He did not regard manual training, in the elementary school at least, as an end in itself, but as a means of teaching related subjects. In these grades he would have the industrial courses so broad that they would become the basis of teaching the other subjects. His philosophy also required that problems that were real in school life be selected as the basis of instruction rather than those of adult life.

In support of Dewey's philosophy, Professor Charles R. Richards stated that "When we take up the problem of handwork in this spirit, we are going to recognize that a nice sequence of difficulties in the work may be of less importance than the question of motive or the significance of a project to the real interests of the particular moment. Accuracy and precision have commonly been referred to as the essential qualities of all educative handwork, but accuracy is natural only when its necessity is appreciated by the worker, and this will be the case only to the degree that the need for accuracy is perceived to be an inherent condition of success in the task and not as a quality imposed from without."[23]

Dr. Frederick G. Bonser contributed a line of thought in 1913, which further clarified this philosophy and perhaps led us to see industrial arts not only as an end but also as a means to an end. He stated that, ". . . it will at once appear that primary emphasis will not be placed upon the production of industrial commodities, but rather upon intelligence and cultivated taste in their choice and use."[24] The most important part of industrial-arts work was developing intelligent consumers. Years later, in 1932, he further clarified this philosophy by stating that, "A study of the making of books is not primarily to produce skill or craftsmanship in bookmaking — few, if any, of the children in a given school will become bookbinders, and if any of them do, it will probably not be handicraft bookbinding. The purpose is rather to develop an insight into an industry whereby the race has put itself on record for untold generations, improving its means step by step, until the great mechanical typesetting machines are subjects of study and understanding."[25]

We can now see our philosophy of industrial arts emerging as a vital, living force, applying to all grades of the public school, the lower grades emphasizing it as a means to an end, with a gradual shift to an end in itself toward the end of the high school and finally merging into vocational education in the last year or two of high school and perhaps two years beyond high school.

With this evolution in philosophy and an amazing industrial expansion came another change in terminology. At first the movement was called manual training, then manual arts, but the tendency still persists in many cases to call it manual training. Charles R. Richards was perhaps the first to suggest the term "industrial arts," which he did in an article in the *Manual Training Magazine* in October, 1904, and so named the third period in industrial-arts development. In refering to this change he stated that "we are rapidly leaving behind the purely disciplinary thought of manual training . . . . Now we are beginning to see that the scope of this work is nothing short of the elements of industries fundamental to modern civilization."[26]

Present-Day Interpretations

Present-day interpretations of the meaning of the term "Industrial Arts" vary but little, although definitions may differ in wording. Probably the most clearly expressed definition is the following: "Industrial arts is a phase of general education that concerns itself with the materials, processes, and products of manufacture, and with the contribution of those engaged in industry. The learnings come through the pupil's experiences with tools and materials and through his study of resultant conditions of life."[27]

Definitions are helpful in interpreting a philosophy only if they are expanded into a statement of objectives. Industrial-arts objectives, in many respects, do not differ materially from those generally accepted for general education. One can see them in the seven cardinal principles of secondary education and a splendid list of objectives is outlined in "Improving Instruction in Industrial Arts."[28] Another clear statement of objectives is found in the state plan of industrial arts in Utah. They are listed as follows:

"1. To develop correct habits, attitudes, and ideals of health and safety in the student.

"2. To develop the student's ability to interpret graphic presentations and use them as a means of self-expression.

"3. To develop in the student a knowledge and appreciation of industry and industrial life.

"4. To develop the student's skill and manipulative ability in using the common tools and machines.

"5. To develop the student's ability to work and live with other people in a democratic society through an attitude of co-operation and service to others.

"6. To develop the student's habits of self-discipline and his ability to proceed orderly in the accomplishment of any task.

"7. To provide experiences which can be used by the student in leisure time and avocational pursuits.

"8. To develop the student's ability to select wisely, buy intelligently, and properly care for the industrial products he buys and uses.

"9. To develop the student's knowledge and appreciation of good workmanship and design.

"10. To provide the student with experiences which will be helpful to him as he selects, prepares for, enters, and advances in his occupation (not trade training).

"11. To develop the student's ability to express himself creatively, using the tools and materials of industry.

"12. To develop in the student a feeling of confidence and self-reliance through doing a job well."[29]

Philosophies, definitions, and objectives, however, are meaningless without an adequate, interpretative plan for putting them into effect in the classroom. This one point is not only neglected in far too many of our courses in techniques of teaching industrial arts, but also comes to the attention of only a few of our school principals and superintendents. We, as teachers, are taking our boys into the shops one hour a day, five days a week to make a book rack, footstool, jack screw, or sugar scoop. When the article is made we realize perhaps that a few skills have been developed, but do we realize that we have done nothing to integrate the boys' shop experiences with the various phases of industrial life we demand in our statement of objectives?

Making the Objectives Function

It is all very nice to say that the development of a knowledge and appreciation of industry and industrial life is one objective of industrial arts, but how does making any one of the articles just men-

Transportation Area

Suggestive Laboratory Experiences	*Suggestive Understandings and Enrichments*
Dismantle, inspect, and reassemble any one of the following:	I. Overview of Transportation Division
Engine, two-cycle	A. History and development
Engine, four-cycle (may be model engines)	B. Types
Accessories	C. Power
Lights	D. Construction
Bearings	E. Design
	F. Operation
Check and adjust, clean:	II. Land Transportation
Spark plugs	A. Highway transportation
Wiring	1. History, development
Carburetor	2. Automotive transportation
Mixing valve	a. Pleasure types
Fuel pump	b. Commercial types
	c. Power plants
	3. Internal combustion

tioned aid the boy in attaining such knowledge unless we make the necessary related material an integral part of the job? Or to say that we are developing the boys' ability to buy intelligently and properly care for the industrial products he buys and uses when we give him no insight into how products are made industrially? We must either have a definite plan for teaching our objectives or frankly admit that our school shop is only a place where some boys do things they like to do while for others it is only a place for "busy work."

The writer does not necessarily subscribe to the Florida philosophy, but that State has a remarkably well stated plan which every industrial arts teacher should study carefully. It is cited here as an example of careful planning. Separate plans are set up for junior and senior high schools in outline form. The junior high program is divided into the several areas of power, transportation, communication, construction, and manufacturing. The outline for each area is set up into two columns. The left hand column is headed "Suggestive Laboratory Experiences" in which numerous jobs are listed and classified into groups. The right hand column is headed "Suggestive Understandings and Enrichments," in which the items of related information are listed which should form the real basis of any industrial arts course. A portion of the outline for the transportation area is reproduced here:[30]

This is only a small portion of the outline for the transportation area. The reader must examine the entire outline to appreciate its value as an example of planning.

The senior high program is divided into general drawing, general woodworking, leather work, basketry and reedcraft, textiles and weaving, plastics, general metals, and general electricity. The outlines for these areas are set up in three column form. A portion of the outline for general woodworking follows:[31]

The column headed "Suggestive Understandings and Enrichments" should play a very definite and active part in all our industrial-arts classes. We find listed here many of the points we must consciously teach in order to achieve our objectives. It must be used in an organized way and not treated as units of knowledge with which we expect the boys to be familiar merely because they complete the required projects in the shop. The teacher must select sources of information and organize the material into a teachable form. How it is presented must be left to the individual teacher. One may be an excellent classroom teacher and will have the greatest success in the study and lecture method in presenting related material. Others may best succeed by use of some type of project method of study, perhaps involving instruction sheets or workbooks.

Whatever method is used in attaining our objectives, we must remember that "worthy experiences," even though clearly stated in our objectives, are not achieved merely because a boy has made a birdhouse, but are only attained through a conscious effort on the part of the teacher and not as a by-product of the educative process. We should never lose sight of the

General Woodworking

Suggestive Laboratory Experiences	*Basic Skills and Operations*	*Suggestive Understandings and Enrichments*
Plan the procedure for work:	A. Planning and Layout	Importance of wood in daily living
1. Make working drawing	1. Design by squares	Design in woodworking
2. Make bill of materials	2. Measure with rule	How to read a working drawing
3. Calculate cost	3. Select stock	How to calculate board measure and cost
Construct:	B. Cutting	Safety precautions in woodworking
1. Cutting board	4. Use a crosscut saw	Identifying common kinds of wood
2. Knife rack	5. Use a ripsaw	Characteristics and working qualities of common kinds of wood
3. Scrapbook covers	6. Saw to line	Methods of cutting wood
4. Bicycle rack		Standard dimensions of lumber
Construct:	C. Squaring	Kinds of wood and their uses and classification
1. Toolbox	7. Gauge lines	Forestry, lumbering, and conservation
2. Sawhorse	8. Assemble and adjust plane	How lumber is dried and seasoned
3. Trellis	9. Plane an edge	Effect of moisture and temperature upon wood
4. Lawn chair	10. Test with try square	How veneer and plywood are made
5. Stepladder	11. Plane a surface	History and development of woodworking tools
	12. Plane end grain	Labor organization in the woodworking industry
		Vocational opportunities in woodworking and allied occupations

fact that we have a philosophy of industrial arts, that it is a very real, dynamic, living thing, and that only by a genuine understanding of it, its origins and its implications, may we escape the barbs of our critics.

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Twenty Years of Shop Guidance In Teacher's Placements

WILLIAM H. BOWERS
Supervisor of Industrial Arts
Tuckahoe High School
Tuckahoe, N. Y.

January 17, 1950

Mr. William Conklin
Bronxville, New York
Dear Mr. Conklin:

It gives me great pleasure to inform you that the Admissions Committee, basing its decision on your record up to date and satisfactory scores in the Selective Admissions Examination, has taken favorable action upon your application for admission into the Industrial Arts Division of the college.

I am looking forward to seeing you in September and all of us here are eager to help you as you enter this new and exciting phase of your career.

Sincerely
Oswald Laubenstein, Chairman
Admissions Committee
State Teachers College,
Oswego, N. Y.

The foregoing letter was received recently from Oswego, and is a direct quote.

Bill is an excellent student here at Tuckahoe High School. He should be a fine *shop* teacher in a few years. Bill will be the fifteenth student to enter Oswego.

This practical guidance program began in 1934, here in the industrial-arts department at Tuckahoe High School, when Samuel Kerr was influenced to enter Oswego. *Sam* was graduated in 1938 and today is the industrial-arts director at Hampton, Va.

Last year Richard Muller completed his work at Oswego and is today employer at Callicon, N. Y. Richard is very happy to be today an industrial-arts instructor.

Jack Jones and Heinz Walter, two former G.I.'s, are to be graduated in June, this year. They are right now *practice teaching* in New York City.

Charles Connors, a Negro, was graduated last year. He completed the four year college course in three years. Charlie is now attending New York University working for his master's degree.

Lieutenant *Clete* Sheller, Oswego '48, is today teaching in Mt. Vernon, N. Y.

The writer has all of the senior high industrial-arts and drafting boys at Tuckahoe High School in his classes. Most of the students take these courses for three years. The classes are of fair size, and the enrollment is entirely elective. Due to personal contacts with these students, and to individual instruction, Mr. Bowers is able to judge the potential industrial-arts teachers in these groups.

Free tuition is given to New York State boys at Oswego. Most of these students are relatively poor, and *the* free scholarship is an incentive. Each week during the school year a large guidance poster, made at home by the instructor, is placed on a large bulletin board, which occupies a prominent place in one of the school corridors. This board is reserved for industrial-arts and drafting guidance posters. Something about Oswego is *always* on this display board, even though the guidance posters often feature other phases of *shop* guidance. This poster weekly job occupies from 6 to 12 hours of the instructor's leisure at home, each week.

In related *shop* work Oswego is also stressed and incorporated into the shop students' notebooks, along with other guidance features.

To this writer, teaching is his life, and it is just as interesting today as it was twenty years ago when he began at Tuckahoe.

The greatest satisfaction he ever received is the knowledge that he is helping some boys to enter the teaching profession, a career which pays huge dividends besides a salary, namely *the opportunity to help others.*

Why is vacation time danger time on the highway? The National Safety Council blames more travel — more chance for drivers to make mistakes. Avoid trying to cover too much distance in one day, which leads to speeding, fatigue, and mechanical failure. — *Safety News.*

Falls kill more persons in the home than any other type of accident. Spring housecleaning tip: use ladders to wash walls, windows, change storm windows. Watch your step carrying bedding and clothing out to air. — *Safety News.*

Mind your motor manners. Courtesy will prevent accidents. — *Safety News.*

CAN YOU HELP US?

One of our readers would like us to publish more projects that require operations on a metalworking shaper or on a milling machine. Readers are invited to submit such articles.

Some Leaders in Industrial Education

WILLIAM T. BAWDEN
Director of Publications
Kansas State Teachers College
Pittsburg, Kans.

(*Continued from page 152 of the April, 1950, issue*)

FRED CAMPBELL WHITCOMB

During many years of study of the careers and achievements of the leaders in industrial education, certain questions have kept coming to mind. Is there any relation between leadership and the length of continuous service in some one position? Are conditions more favorable for securing recognition and influence if one remains, for the major part of his career, in one position, or institution, or school system? Is there any relation between achievement and the number of different positions held? Is one more likely to *succeed* by moving about frequently from one position to another, from one type of work to another, or from one part of the country to another?

These questions are of vital concern to the young educator in the early stages of his career. They are questions which everyone must decide for himself, with very little specific help from others. The most that one can hope for is general counsel and suggestions, and the opinions of those who may be willing to talk about these developments in their own individual careers.

Data Inconclusive

Recently I made an analysis of the careers of ten leaders in industrial education, selected at random, for whom the pertinent data were readily available, to see whether there is a pattern of similiarity. One man spent his entire active career, 40 years, at one university, with several promotions; one man spent 35 years in one institution; one man spent 43 years in one city school system. Of the remaining seven, no one approached the three records just mentioned, the longest terms of service being 21 and 19 years, respectively. No other individual served longer than 11 years in one position.

Of the seven leaders mentioned, one served in nine different positions, one in seven, one in six, three in five each, and one in three positions. The geographical distribution of positions ranged from New England to the Pacific Coast, and from the Great Lakes region nearly to the Gulf.

General conclusions may not be derived from such a small number of cases, although certain negative observations seem justified. For example, the experiences of these individuals indicate that long tenure in one position, or in one type of position, is not essential to the attainment of leadership and influence. Again, the moving about from one position to another, and even the transfer from one type of position to another quite different, do not effectually prevent personal growth and achievement. Further, it seems tenable that moving from one part of the country to another is not in itself a bar to progress.

If a potential leader is to realize the full development of which he is capable by remaining in the position to which he is appointed relatively early in his career, it would seem as if the following conditions must be fulfilled as a minimum:

1. The institution or the system must be big enough, and progressive enough, to give full scope, opportunity, and encouragement to leadership qualities and abilities whenever, wherever, and to whatever extent they manifest themselves.
2. The institution or the system must be able and willing to provide the essential financial inducements and rewards, and appropriate recognition in other ways of superior services.
3. The administration must be characterized by intelligence, insight, vision, breadth of understanding, and ability to recognize potential leadership, and itself capable of providing inspiring leadership.

Fred Campbell Whitcomb

These are some of the factors to be taken into consideration by the ambitious young teacher when he is offered something that looks like advancement in a change of position. In addition, he must know whether he possesses the requisite native talents, and adequate foundation of general education and scholarship, the essential professional and technical preparation, and a genuine liking for unremitting labor.

An Excellent Example

These reflections were inspired by a survey of the data which I have been assembling upon the subject of this sketch, the late Professor Fred C. Whitcomb, who spent 38 of the 48 years of his career in an institution that was big enough, and willing, to provide opportunity for the development of his talents, and recognition of his achievements. Remaining in an institution for 38 years, one becomes identified with its spirit, its traditions, and its ambitions to a degree not likely under a shorter tenure. With the lapse of time one sees an almost complete turnover of the faculty, and experiences the stimulus of successive waves of newcomers, bringing fresh enthusiasms, new points of view, and youthful vigor.

If one is made of the right stuff, is reasonably hospitable to new ideas, is capable of comprehending what he sees unfolding about him, and is disposed to meet the challenges and the questionings of his colleagues in the proper spirit, 38 years of association with almost any college or university faculty will in itself afford a liberal education. Of such stock was the subject of this sketch. He reached out and appropriated to himself from the experiences and influences that interacted with and played upon his character, and he grew into the stature of an outstanding leader in his chosen field.

Early Life

Fred Campbell Whitcomb was born on November 8, 1870, at North Vernon, a small town in southern Indiana, about 60 miles north of Louisville, and died in Fort Hamilton Hospital, Hamilton, Ohio, on December 19, 1946, in his 77th year. He was the last surviving member of his immediate family.

One of his ancestors came from England in 1630, and settled in Massachusetts. Members of the family later moved to western New York, and still later to southern Indiana.

Upon graduation from high school Whitcomb attended Franklin College during the summer and taught in the public schools of Indiana during the regular school year. In this way he was able to finance his college education. His school administration career began in 1895 when he was elected principal of the senior high school at Delphi, Ind. After two years in this position he served for one year in a similar capacity at Tipton. He then went to Bluffton, Ind., where, as principal of the high school, he inaugurated a program of industrial arts, known then as manual training. This was one of the first programs of industrial arts to be introduced in an Indiana high school.

He was graduated from Franklin College, Franklin, Ind., with a B.S. degree in 1900. He was awarded a graduate scholarship at Teachers College, Columbia University, New York, where after one year of study, 1903–04, he was granted a diploma in industrial education. In 1936, Franklin College conferred on him the honorary degree LL.D., in recognition of his achievements as an educator.

Following his year of study at Teachers College he was appointed director of the School of Industrial Education, Howard University, Washington, D. C., where he remained from 1904 to 1906.

Howard University, it may be said in passing, was established by Congress in Washington, D. C., in 1867, as an institution of higher learning, nonsectarian, open to students of both sexes without regard to race. It is known chiefly, however, for its work in higher education for Negroes. The University includes: the College of Arts and Sciences, Teachers College, School of Theology, School of Medicine, School of Law, School of Manual Arts and Applied Sciences, Conservatory of Music, Library School, and College of Commerce. It occupies a campus of over 55 acres, on high ground near the National Soldiers Home, and about three miles nearly due north of the Capitol. With buildings and grounds valued at approximately $8,000,000, it reported an enrollment in 1946–47 of 3809 men; 2378 women; total, 6187.

In the fall of 1906, Whitcomb left Howard University and went to Miami University, Oxford, Ohio (near the Indiana line, 33 miles northwest of Cincinnati), as professor of manual training and director of the department of manual arts. In 1928, the department was reorganized, and he became the first director of the division of special subjects, later designated the division of practical arts. As reorganized, the division included the departments of physical education, music education, home economics, art education, business education, and industrial education. In the summer of 1941, having passed the age 70, he retired as head of the division; but with the outbreak of the war he continued to teach in the war emergency program until 1944. In this capacity he taught classes in drafting to women trainees from Wright Field, and later was instructor in the U. S. Navy V-12 Officer Training Unit at Miami University.

Miami University is said to be the second oldest state institution of higher learning to be established west of the Allegheny Mountains. The first was Ohio University, at Athens, Ohio, founded in 1807.

Miami University "represents a trust established by the Federal Government in 1794, and assumed by the state of Ohio in 1803." The institution was founded by legislative act in 1809, and the first college classes met in 1824. The institution is described as "a distinctive type of state university operating in a limited field of subject matter associated with the liberal arts and basic sciences." Provisions for liberal education and for the professional preparation of teachers have been prominent since the early years.

Important Developments

For an outline of the historical developments at Miami University, in which Professor Whitcomb played an important part, I am indebted to Dr. Ernest J. Ashbaugh, dean of the School of Education since 1929.

Teacher training was begun at Miami University under an act of the Legislature of 1902 which established a Normal School on the campus. The catalogue of 1903–04 showed that courses in public school music and public school drawing were included among the courses offered.

Manual training was established in 1905, and the next year Professor Whitcomb was appointed to head up that work. In 1907–08, a two-year curriculum was set up for the preparation of teachers of manual arts and for teachers of public school art, as well as for regular elementary grade teachers. In 1908, a two-year curriculum in public school music was announced, and in 1909, a two-year curriculum in domestic science.

In keeping with the growing demand for teachers with more preparation, plans were matured for four-year curricula leading to the baccalaureate degree — manual arts or industrial education, in 1913; home ecomonics, in 1915; and business education, in 1917.

The earliest reference to a division of practical arts is in 1923, in which year the division included art, home economics, and industrial education. Physical education for men was started in 1925, but it was not included in the division of practical arts at that time.

The administration of Dr. Alfred Horatio Upham (1877–1945), who served as president of Miami University from February, 1928, until his death in 1945, inaugurated a complete reorganization of the institution. Under his direction, the institution was organized in four co-ordinate divisions, namely: liberal arts, which had been an active concern of the University from the beginning; the teachers college, which unified the work that had been in progress since 1902; business administration; and the fine arts — the latter two divisions being newly created in the fall of 1928.

At that time, the departments of art, business, music, home economics, physical education, and industrial arts were brought together for administrative purposes and designated the division of practical arts, under the directorship of Professor Whitcomb. Professor Whitcomb's thinking doubtless had much to do with the setting up of the plan of organization, since President Upham had worked here on the campus as head of the English department during those earlier days when the teacher training program was being developed.

The record shows that Dr. Upham came to the department of

English as instructor, in 1897; was promoted to head of the department in 1913, in which capacity he served until 1920. After an interval of service elsewhere, he returned to Miami University as president, in 1928. Dr. Whitcomb and Dr. Upham were therefore closely associated during a critical period of expansion and development.

"The plan of organization was not consciously patterned after that of any other institution, and I know of no other institution which has comparable organization. In the catalogue these departments appear as independent entities, each with its own head. They are brought together under the title, division of practical arts, for general administration and student advisement."

Unique Plan of Organization

The Division of Practical Arts at Miami University under Dr. Whitcomb's direction, as outlined above, represents an unusually wide spread of administrative responsibility. I do not know of any other institution of higher learning offering anything comparable to it. At first thought it would appear to be an assignment too comprehensive and too burdensome for one man to do justice to. Upon further reflection that no one person can be expected to furnish technical leadership in so many and so varied fields, it may be assumed that each Department is headed by a qualified expert, who may indeed enjoy more freedom from administrative red tape, more opportunity for the exercise of initiative, and more encouragement to genuine achievement under this plan of organization than under the more customary plan of reporting directly to the president of the institution, or to the dean of the college.

So often the duties of the president, and the outside demands upon his time and energy, make it impossible for him to deal effectively with the many technical problems arising continually in the conduct of special departments. The appointment of an administrative assistant having a technical background and training, and a practical turn of mind, even though not himself an adept in every one of the fields represented, is one way of insuring a friendly, sympathetic, and intelligent hearing for every proposal and recommendation.

In these circumstances of heavy responsibilities and onerous duties Dr. Whitcomb gave an excellent account of himself, and amply justified his selection for the post. Thorough knowledge of human nature, facility in understanding the point of view of the other person, ready insight into the fundamentals of a problem when presented, full consideration for the interests and welfare of his associates, and devotion to the best interests of the institution as a whole — these were some of the qualities that endeared him to those who worked with him and knew him best.

(To be continued)

Industrial Arts vs. Unsubsidized Vocational Education

EDWARD K. HANKIN
Assistant Professor of Education
Vocational Teacher Education Department
University of Pennsylvania
Philadelphia, Pa.

Within the realm of shop instruction in our secondary schools, we now have two forms of *specialized* vocational education. One is the subsidized program which, generally speaking, is well established and clearly identified as to objectives and function. The other form, for the most part, is not openly recognized as specialized vocational education. Commonly it is classified as part or all of the industrial-arts program. Since this second form appears to be *growing* in frequency and size, and since there are real and potential *major losses* resulting from present practice, we are faced with a situation demanding the prompt attention of all educators in the fields of trade and industrial vocational education and industrial arts.

Subsidized and Unsubsidized Vocational Education

At the outset we must identify this second form of vocational education, and this is not a simple matter. In some school districts it is operated parallel to a subsidized program. In other districts it is offered in place of a subsidized program. In some of these latter situations the unsubsidized form has displaced or is displacing a formerly operated subsidized program; in others, a subsidized program has never been offered.

In both situations the unsubsidized program of vocation education tends to displace a true industrial-arts program having general education objectives. In many schools this displacement is complete, while in others there has been a partial diversion of teacher time and attention, facilities, and funds which, on the surface at least, are intended for industrial-arts purposes.

Actual and Declared Objectives May Differ

Fundamentally, identification must be based on the objectives of the work being carried on. Sometimes the actual objectives are in conflict with the declared objectives, and it is the actual objectives which indicate the proper classification.

The accepted purpose of industrial arts is general education: Serving those needs held in *common* by a *majority* of pupils, which can be met through shop instruction. These objectives are well recognized and need not be restated here. However, on the basis of these general education objectives there is no justification for differentiating shop instruction with relation to the specialized vocational futures of pupils.

On the other hand, specialized vocational education, *whether or not it otherwise conforms to the requirements for subsidy,* is specifically differentiated with respect to the vocational futures of pupils. Criteria for identifying this aspect of education are stated as follows:

1. The instruction in question will provide for the development of the needed ability or skill and the acquisition of information or knowledge which will be a *definite asset to a worker in this occupation.*

2. The possession of this ability or skill, information or knowledge will be of *more*

value to a worker in this occupation *than to a person who is not a worker* in this occupation.

3. The possession of this ability or skill, information or knowledge will, under ordinary conditions, be *an asset to all workers in this occupation* on the level for which training is to be offered.

If all three of the above statements apply to the instruction in question it would seem that it is vocational (italics added).[1]

Dual Program in Large Cities

Two of the larger cities in which rather dual programs of specialized vocational education are being offered are Philadelphia, Pa., and Los Angeles, Calif. They are cited here as rather typical examples of undeclared specialized vocational education programs, and to illustrate the losses which derive from the practice. In both cities there are subsidized programs of vocational education with qualified staffs and outstanding facilities. In both school districts the comprehensive senior high schools include in the program, shop courses which are not labeled vocational education. Examination of the actual practices and objectives of these high school courses reveals that they conform more to the criteria for specialized vocational education quoted above than they do to the objectives of industrial arts. This is most evident from discussions with teachers and supervisors of these classes who reveal that content and methods are based upon *specialized employment* demands, and who *evaluate* the work on the *placement and success* of graduates. Instead of being courses in shopwork, elective or required, as part of the curriculum of any or every pupil in the school, the shop instruction is set up as a curriculum major in itself, specialized as to the various fields of industry. In some of these schools the practice is quite overt. In one Philadelphia school, for example, the students' handbook of information describing programs of studies reads as follows:

Industrial arts—For boys who wish to train for only one trade, and expect to follow it without further education, Northeast offers several specialized industrial courses, including: industrial electric, industrial auto, industrial building construction, industrial machine.[2]

In Philadelphia this unsubsidized form of specialized vocational education is officially labeled *industrial curriculum* and not industrial arts. However, as shown above, the term industrial arts is applied by individual schools and used informally by less precise, or confused, or uninformed, persons. Teachers of shop in the *industrial curriculum* are required to be certified to teach on *either* an industrial arts or a vocational basis. The industrial curriculum comes under the central office jurisdiction of the division of vocational education for such matters as supply and tool requisition, but it is reported officially as industrial arts and part of the general program of education. Shopwork is also offered in the Philadelphia comprehensive high schools under the classification of *mechanic arts curriculum*. This work to only a limited extent qualifies as industrial arts. For the most part it is *specialized* basic preparation for students looking forward to such occupations as:

Architectural or mechanical draftsman; civil, electrical, chemical, aeronautical, marine or stationary engineer, or others.

College or some other form of post high school preparation is necessary for the occupations listed above. This curriculum will also be found useful in preparing you for immediate employment.[3]

These two curriculums, essentially vocational in nature, in most of these schools, have displaced shopwork that is truly industrial arts.

In Los Angeles, the subsidized program alone is identified as *vocational education*. Under the director of vocational education, it is segregated on the junior college level, and integrated with the comprehensive high school below the 13th year level. For various reasons, in recent years, this integrated subsidized vocational program has considerably diminished. The secondary pupil need for specialized vocational education has not diminished, however, and this function has been assumed by the industrial-arts program, under that name.

This unsubsidized specialized vocational education is officially classified as industrial arts in Los Angeles. It is informally referred to as *terminal* education in recognition of its being the last full time school preparation for the pupils it serves. In contrast to the subsidized program, this so-called industrial arts provides a given pupil with fewer hours of shop experience. It also is carried on in general unit shops which provide, in one room, for instruction in two or more related occupations such as several fields of metalworking, or various electrical occupations. By this means the program of a given comprehensive high school provides for preparation in a greater number of more varied occupations than would be otherwise possible with the same number of strictly *unit shops*. This is in keeping with the varied pupil interests and aptitudes, and the limited employment opportunities which might not justify the operation of unit shops. Of course, with *fewer hours* of instructional shop experience per pupil, the graduates of such a program are *advanced learners* to a *more restricted degree* than are graduates from a subsidized vocational program. Nevertheless, this work, called *industrial arts*, is in fact *specialized vocational education*.

Recognized Needs for Specialized Vocational Education

It is significant that these and many other school districts find a need for a form of specialized vocational education which does not meet the present federal requirements for subsidy. Further, that they consider the need of sufficient importance to meet its additional expenses, capital and operating, without federal and state financial stimulation. It would appear, then, that an answer to this situation would *not* include any curtailment of this presently unsubsidized program. More probably, further development and improvement of this work is indicated.

That something must be done about this situation, especially on the local level, probably also on the state level, and possibly on the federal level, is apparent when the real and potential losses are considered.

The writer recognizes four of these losses as of major importance, not only to specialists in the fields of industrial arts and trade and industrial education, but also to administrators, school boards, taxpayers, and pupils. The *first of these losses* occurs in districts where there is a dual program of specialized vocational education, such as the two mentioned above. It occurs to the extent that these programs are independent and yet effective. It results from a *duplication* of personnel, effort, and facilities, especially in the carrying out of such functions as curriculum planning, supervision of instruction, employer contacts (including the follow-up of graduates) and the planning and procurement of facilities, equipment, tools and supplies.

To the extent that these functions are *not* carried out to a *desirable degree* for an independent unsubsidized program, there is a *second loss* in terms of efficiency and effectiveness. Under the stimulus of federal subsidy a body of trained personnel and a fund of know-how have been developed which could and should make great contributions to this second form of vocational education. This second loss occurs both in districts offering a dual program and in those offering only the nonsubsidized program.

A *third loss*, not necessarily in its order of importance, is in connection with the general program of education. It occurs in

[1] *Administration of Vocational Education*, Vocational Education Bulletin No. 1, General Series No. 1, Rev., 1948, Office of Education, Federal Security Agency, Washington, D. C., p. 31.

[2] The Northeaster, Northeast High School, Philadelphia, Pa., 1949, p. 70.

[3] "A Road Map of Your Future," Program of Studies of Senior High and Vocational-Technical Schools, Philadelphia Public Schools, Philadelphia, Pa., p. 18.

proportion to the extent to which the unsubsidized vocational curriculums displace true industrial-arts courses. There are readily identified life centered objectives which can be met in school only through shopwork. The demands of such important common life activities as manual hobbies, home mechanics, consumer functions, and driver-owner automobile maintainance can be met to a great extent by the skills, knowledges, and appreciations to be developed in industrial-arts shopwork. In addition, a good industrial-arts course can contribute to *vocational-general education* through the exploration and development of interests and aptitudes and the fostering of such generalized and transferable qualities as work habits, accuracy, neatness, and self-reliance. Teacher time and effort, facilities and operating funds are necessary to the attainment of these objectives and any *diversion* to specialized vocational education indicates losses in the area of general education.

As a *fourth loss,* the writer recognizes an inefficiency resulting from a general confusion on the part of educators and others as to what is industrial arts and what is specialized vocational education. We have established objectives and standards for both. With the present confusion it is difficult to apply these in the evaluation of the work being done. Teachers, students, administrators, supervisors; all must function with less efficiency when objectives are obscure. Taxpayers and school boards can hardly be expected to see through such confusion to the extent of giving justified support for desired results.

Need for Clarifying Name and Function

What ought we do about this situation? The first change called for is clarification of name and function. On the basis of actual objectives, let us call all vocational education by its right name. If a new term is needed to identify unsubsidized vocational education let's coin it and use it. By all means *let us stop calling it industrial arts* so long as industrial arts is defined as it is at present. Both forms of vocational education, as well as industrial arts, will benefit from this clarification.

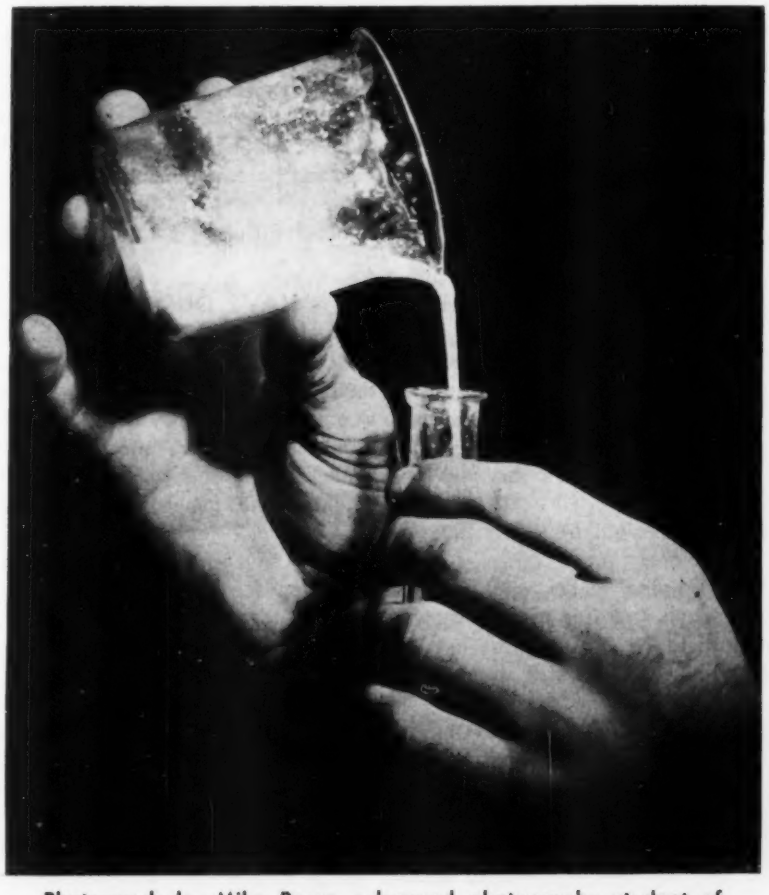
Then let us encourage school districts to offer the type of shopwork its students need. If true industrial arts is needed, and surely it is in most schools on all levels, we should give as far as we can, all the stimulus and assistance necessary. Specialists in the field of industrial arts should foster their work for the general education objectives which only it can serve well.

If there is need for a form of specialized vocational education which cannot meet the present requirements for subsidy, and there evidently is such a need, then it should be recognized and helped by vocational education specialists. Denying the need, or ignoring the existence of the work itself, has not prevented its development. Much can be done, and ought to be done, by vocational educators to make this second program more effective.

Possibly some way can be found to give this presently unsubsidized program financial stimulus and assistance through state, if not federal funds. At least vocational educators working on state and federal funds could be authorized and encouraged to lend their efforts to this second program. In some states this is now informally being done.

One thing that does not appear desirable is to attempt to force this second form of vocational education to conform to present subsidy regulations. For administrative and other reasons this unsubsidized program has been developed to fill a need. Changing it on the points of its nonconformity, especially in such externals as number of hours or length of day, appear unjustified and would amount to suppression or a continuation of the present masquerade.

Where dual programs of vocational education are being operated the situation should be openly recognized by all concerned. Then the overlapping, duplication, and lapses should be disclosed and reduced. One big obstacle probably stands in the way of making this change. Some of those now associated with the unsubsidized program may fear loss of status or jurisdiction, or more properly, may fear for the future of this educational baby they have nurtured. It should be recognized that there is more than enough work and responsibility for all who are willing. Co-operative planning and effort should assure each educator an opportunity to function according to his qualifications, and should result in more and better service to the students and to society.



Photograph by Mike Perez, advanced photography student of the graphic arts department, Senior High School, Tucson, Ariz. Submitted by Harry A. Goldstein, instructor of photography

Industrial Arts and Vocational Education
John J. Metz, Editor

MAKE IT A SAFE VACATION

Teachers must be cognizant at all times that they must think of others more than of themselves. "I am my brother's keeper" must mean more to them than to almost any other type of profession. For that reason they must take great care to train the young people under their charge so that they can effectively meet the dangers of the coming vacation period.

The Accident Prevention Department, Association of Casualty and Surety Companies, 60 John Street, New York City, in a former issue of their *Safety Clips*, offered some safety tips which may well be presented to all shop classes from now on until the end of the school year.

At beach or pool:

1. Be sure your swimming place is free from obstruction, undertows, and dangerous currents.
2. Look for and obey warning signs. Swim parallel to shore and stay within roped areas.
3. Wait an hour after eating before swimming. If you are hot, wait until body has cooled off before exerting yourself in water.
4. Know your limitations. Your swimming ability should determine the distance from shore you may go.
5. Swim with others. It's safer and far more fun.
6. Be alert when children are with you. They are accident prone.
7. Before diving, make certain water is deep enough and free of underwater obstructions.
8. Stay out of the water if you are tired.
9. Stay out of the water during a thunderstorm.
10. When swimming in lakes or at beaches where boats are used, be careful to avoid colliding with them. Never swim into areas where motorboats are used.
11. Don't be reckless. The chances you take endanger others as well as you.

The foregoing is good for those who go swimming but there are many other vacation hazards that need to be watched. For instance:

1. Remember that there are more cars on the road during summer than at any other time during the year. Be cautious when crossing or walking on highways.
2. Campfires may become very dangerous. Take care of yours and make your vacation a happy one.
3. Rocking the boat has been the cause of many drownings. Be safe when you are boating.
4. Boat engines are usually run on gasoline. Gasoline is very flammable. Be careful with it.
5. Climbing trees may be fun but it also is very dangerous. Many fine boys have grown up to be crippled men because of tree climbing accidents.
6. Flying kites is an excellent pastime. Do your kite flying where there are no electric power lines.
7. Taking sun baths may or may not be healthy, but overexposure to the sun's rays is definitely bad. Avoid it.
8. To be healthful, drinking water must be pure. Avoid drinking water that is or may be polluted.
9. To avoid pain be careful not to come in contact with poison ivy, poison oak, and poison sumac.

Teachers also will find that it is wise to observe the foregoing suggestions.

HAVE OUR FEDERAL LAWMAKERS FORGOTTEN?

Vocational educators had hoped that their field would receive $3,456,240 more George Barden money than they did last year, but they were informed that they would have to be satisfied with $19,842,760, the same amount as last year.

It is true, 19 million dollars is a huge sum of money, but not receiving the asked for larger amount, will force communities carrying out vocational programs to dig deeper into their pockets if the work is to be carried on at the present level of excellence and at the present tempo. It is a foregone conclusion that the cost of this type of educational work will not become any less than it is now. As a matter of fact, it will increase as teacher salaries and the cost of equipment and materials rise.

Now if our state and municipal lawmakers take the same view as do the legislators at Washington, the plight of vocational education will soon be what it was during the depression, when industries ceased to hire apprentices and when even vocational educators spoke disparagingly about the futility of teaching certain trades, because industry did not need men trained in skills at the time, and that some of the skills needed then might not be required when business and industry would again resume its normal functions.

When shortly before World War II, the automobile industry was looking around for toolmakers, they had to scout the entire country only to discover that they could not find all they needed.

Our shortsighted lawmakers at Washington may have the idea that skilled workers can be trained in a few hundred hours as was done with some phases of semiskilled labor during World War II.

It is to be hoped that their decisions now will not cripple vocational education so badly that it cannot react to necessity with the rapidity that it did when the hour of need arose after Pearl Harbor.

And while we are speaking about vacations, it may be well to discuss with your students the value of having a good handicraft hobby to take up the slack when other amusements begin to pall, or when the weather is such as to make outdoor sports unfeasible.

Find out from your students how many have such hobbies, how many have tools at home, what kind of tools, what kind of home shop?

It may also be worth while to discuss with them, how to produce makeshift tools to fill vacancies in their tool equipment.

Your students need to be reminded of the beneficial effects of homecraft work. Make the most of this opportunity.

PLEASE OBSERVE

The September issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION is mailed to the subscribers shortly after August 20. The press runs are always kept as low as possible because of excessive material and production costs. Be sure, therefore, that we have your new permanent address so that there will be no voids in your volumes. Frequently we are unable to send a second copy to a subscriber. Please help us keep our lists correct.

When sending in your change of address, be sure to include your zone number, and also your old address.

Psychology of Participation as a Factor in the Conference Method

JOHN A. BUELKE
Assistant Professor of Education
State Teachers College
Geneseo, N. Y.

Whenever, in the past history of man, a problem had to be settled which required the thoughts of more than one person, the conference method was used. Whenever co-operative action occurs, there is necessarily some sharing of the mind — some mental collaboration, and some kind of expression. Upon the acceptance of these premises, an interesting application of certain principles of social psychology can be developed.

Participation a Dynamic Factor

Our democratic philosophy indicates faith in the phenomenon of participation. There have been numerous instances where *participation* has been considered more important than *real contribution*. College students, in raising questions about their grades, frequently assert that they have participated conscientiously in class activities. These students seldom try to evaluate their participation level, and usually consider mere presence as adequate evidence of participation. Even good citizens of a democratic nation will boast of voting, but will disregard the more important consideration of the use and qualification of their vote. Therefore, it is important before going on to discuss the psychology of participation that some definition be given the term. By participation we mean the voluntary effort of an individual to place before others of his kind, significant and constructive thought. When the words, "constructive thought" are used a very pointed direction is given to the discussion which follows.

A second consideration involved in the matter of *real participation* is the nature of the group and the setting in which interaction supposedly takes place. No matter what one may say to the contrary, a group is made up of discrete and deviating individuals. It follows then, that participation must also be considered in terms of the peculiar qualities that exist in the group situations encountered in conference method. Allport makes this clear in a statement about crowd or group behavior. He says:

> The mere adding up of the reactions of isolated individuals has no meaning whatsoever beyond mere enumeration. But given the situation of the crowd — that is, of a number of persons within stimulating distance of each other — we shall find that the actions of all are nothing more than the sum of the axioms of each taken separately.[1]

Consideration of the peculiar individuality of each member of the group, as an item in the matter of participation, appears as fundamental in the approach of this paper.

Psychological Factors Involved

By assuming, first, that conferences meet for definite purposes, and second, that those members who are in attendance are present because of some very direct concern in the problems of the conference, it is possible to proceed to the psychological factors involved. The factors are considered under a series of headings which follow:

Personality Considerations

No matter what the number of persons taking part in the conference, there is always the undercurrent of personality differences to consider. A wise and experienced leader may have some opportunity to forearm himself when personality conflicts have been known to exist in a group, but seldom is it possible to prepare in advance to handle the situation where members react to the manner in which a thought is stated rather than the thought itself. Even the use of an excitory expression, the voice inflection of an individual, or his posture reflects the personality of the person making a statement. The "I," in constant use as a personal pronoun, may betray personality quirks that require the attention of a conference leader. From another point of view, the individual who has certain dynamic qualities may "steal the show" by ill-advised puns, profanity, or superficial humor. A long list of other personality deviations and human maladjustments might be developed to include the characteristics of most members of a conference. A good conference leader may accomplish more by adroit handling of personality differences during a conference than he may accomplish in the mere development of thought. Either outcome precedes later progress in the development of a conference.

Social Attitudes

Items that classify under the heading of attitudes may be variously known as emotionalized feelings, prejudices, or even intolerance. Persons whose work takes them among great numbers of people have learned to respect and to avoid certain topics. They have become aware of social attitudes through unhappy experiences. For purposes of definition, attitudes may best be described as predispositions toward feeling a certain way about people, ideas, or institutions, such predispositions most often the result of long-term indoctrination rather than conscious or deliberate thought. The influence of certain terms like "communism," radicalism, dictatorship, or "Jap" are illustrative of another attitude consideration. On different occasions, peculiarly local or colloquial expressions may require careful handling. Strangely enough, symbolic posture, grimace, or body movement may convey attitude and meaning. In still another way specific occurrences may so color attitudes of conference members, that certain aspects of a conference may be given disproportionate attention. The "attitude" problem is indeed, a difficult one to handle, and is worthy of considerable study by a conference leader.

Stimulation Considerations

One of the most mysterious factors of all human conduct is the phenomenon of stimulation. Involved in this consideration is the effect of words, objects, or situations, on different individuals. Psychologists who have studied learning have tried with little success to measure stimulation values, and the concomitant problem of individual differences in reaction to identical stimuli offers little more encouragement. Included in the factors that affect conference success are the nature of the setting, the abundance of materials which suggest ideas, and the devices for recording and presenting facts. Public speakers have described innumerable instances of trying everything to stimulate

[1] Floyd H. Allport, *Social Psychology*, p. 5 (New York: Houghton Mifflin Co., 1924).

some individual to reaction or contribution. In the case of persons who have become participants in a conference out of a sense of duty or from other compulsion, a leader may find that the stimulus value of even an excellent approach to conference leadership may fail.

Social Incentives

There are those who would say that the matter of social incentives has been included in one or more of the previous considerations. However, when definition confines this factor to the items of prestige, imitation, gregariousness, and perhaps, loyalty, an interesting topic is suggested. Both men and ideas enjoy a kind of halo which individuals like to reflect. The unwillingness on the part of most persons to show traits of individuality or conviction has limited the accomplishments of many conferences. In the treatment of this paper, social incentives are essentially psychological items, but more general problems of financial gain, political motives, and protection of position may well be mentioned in passing.

Psychological Limitations

No discussion of conference method would be complete without some thought being given to certain limitations which can best be considered as psychological. Such factors as intelligence, suggestibility and physical impairment must be mentioned. Many a fine engineer in the practical world has little to offer around the conference board. Whether this is a matter of training, (education) qualities of intelligence, or innate limitation, is a moot question. At any rate it is too often encountered. Another factor is the problem of "communication" where words cannot be found, where words will not say what is meant, or where words are ineptly used. There is always the case of the man or woman who can think with someone else, but lacks independence in his own thought. "Stereotypes" and suggestible individuals may be placed in this category. Still another affective limitation is the peculiar voice, the decided speech impediment, or closely related impairment. Each and every one of the psychological limitations mentioned here may be used as samples of more considerations which are the part of every conference leader's task.

Concluding Statement

In the thinking which preceded the organization of this paper, more attention was given to classifying significant factors of the conference than was given to subconsiderations. As a result, many lesser items have been omitted. However, the topics which have been presented are suggestive of the manifold concerns of a skilled conference leader. In dealing with all of the ramifications that are part of the complete conference experience, constant evaluation is necessary. *There are times when adequate handling of a single factor, or group of factors may accomplish more for the members of the group than hasty cover-up methods of leadership.* Conference leading in a democratic society is definitely a greater task, than the mere presentation of a topic and its accompanying objectives to a group. If this paper does no more than point out that fact, it will have accomplished an important aim.

Problems and Projects

TREASURE CHEST

WALTER O. HAYES
Des Moines, Iowa

1. To shape the endpieces turn the miter attachment 10 deg. See Figure 1.

2. Cut the groove in the endpieces for corner joints using a ½-in. dado head. Jig-

Fig. 1. Shaping the endpiece

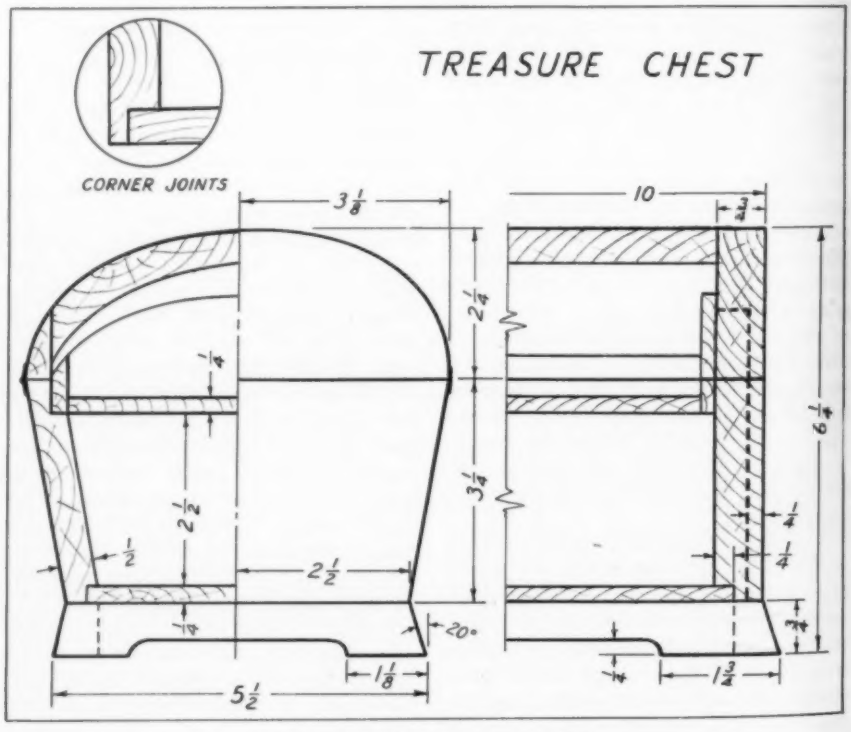


Fig. 1. Details of treasure chest

saw the upper edge to fit the top (after the top is cut to shape). Leave the width of one saw kerf between the dado head and ripping fence for a tongue to fit the dado in the sidepiece. This tongue will need to be shortened after the grooves are cut. Depth of groove is ½ in. See Figure 2.

3. Cove cut the interior of the toppiece by pushing it across the saw diagonally at an angle best determined by trial, although there is a method of determining the proper angle that is too complicated for beginning students in machine woodworking. Figure 3 shows how this is done. Make successive cuts about 1/16-in. deep until desired depth is achieved. Bevel the edges of the toppiece to fit the desired spot on the endpieces by tilting the table 10 deg. Plane the exterior of the top to desired shaped by hand. Mark and saw the curve on the top of the endpieces. Final planing to match after the chest is assembled.

4. Use widest possible dado head for cutting the tray support groove in the sides and the rabbet in the sides and end for the bottom. All cuts in the sidepieces are cut with table tilted 10 deg. in this step. Figure 4.

5. The joints used in this chest are such as to permit gluing and clamping with two hand screws that can be set at 20 deg. from parallel. Clamping blocks may also be made with a 10-deg. taper as shown in step ten which will permit parallel clamping.

The lid is sawed off on the band saw after the glue has set using a 10-deg. tilt on the table, as shown in Figure 5.

6. A 20-deg. taper is cut on the base pieces by tilting the table. A feather board increases accuracy and safety. See Figure 6.

7. 45-deg. miters may be cut on power saw or miter box. Use clamps and stop blocks to assure accurate fit of the pieces. See Figure 7.

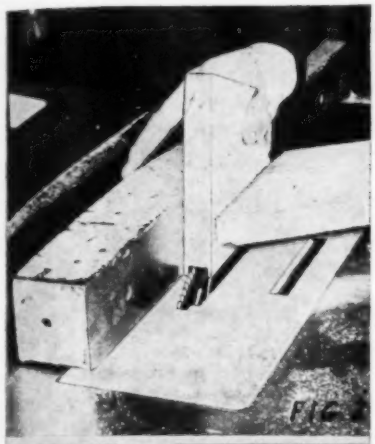
8. Saw kerf for splines is cut with table tilted 45-deg. as shown in Figure 8. If masonite strips are used they will fit most saw kerfs.

9. Scrolled designs on the bottom of foot pieces are best cut on the band saw because of the tapered edge, which must be up while cutting.

10. The clamping jigs shown in Figure 10 are necessary for accurate clamping of the base. Although splines keep the pieces from moving, too much pressure will break these small pieces. The base must be checked for squareness of parts while under clamps.

11. The base may be fastened to the bottom with screws. If the bottom and the base are attached with screws they can be removed for cleaning out excess glue when lining the box and covering it with leatherette.

12. The chest may be finished in any of



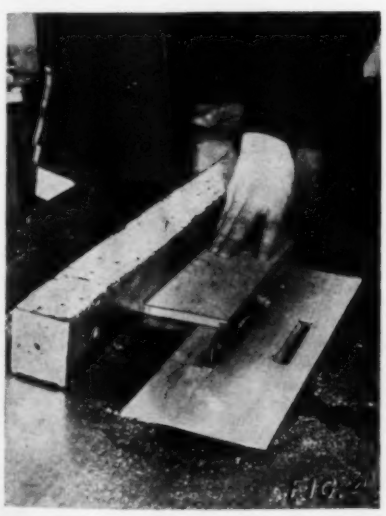


Fig. 2. Cutting the dado into the endpiece. Fig. 3. Cutting cove into the toppiece. Fig. 4. Cutting the tray support groove

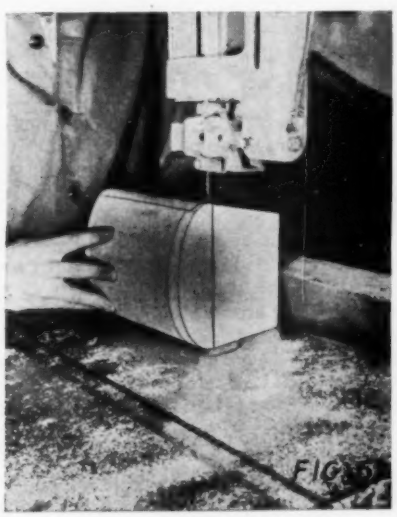


Fig. 5. Sawing off the lid

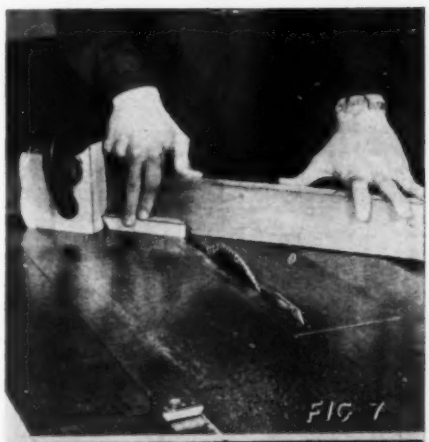


Fig. 6. Forming the pieces for the base. Fig. 7. Mitering the ends of the pieces used for the base. Fig. 8. Cutting the kerf for the splines

the conventional methods using stain or natural varnish or shellac coatings. It also may be given one of the novelty finishes by rubbing enamel or paint into the grain much the same as wood filler is applied, and then waxing or varnishing the chest. Another attractive result may be obtained by covering with leather or leatherette. We encourage each student to try a different type of finish to provide an individual touch. Sometimes the accuracy of workmanship or kind of fit on the joints may dictate the choice of finish.

13. Attach butterfly hinges, hasp and lid support.

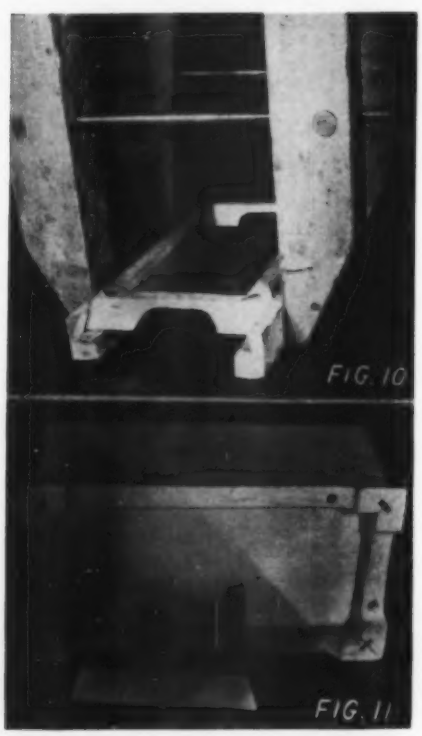


Fig. 9. Cutting the scrolls in the base piece. Fig. 10. Clamping the glued pieces of the base. Fig. 11. Attaching the base

Fig. 12. The finished treasure chest

14. Cut and assemble the tray.

15. The interior may be lined with felt, satin, or other material if so desired. It may be finished natural if the glue is all removed and the interior is clean.

Things to Be Observed

1. All pieces should be planed and sanded before the final cuts are made as it is difficult to do so then without chipping.

2. Because most of the saw cuts are duplicated and must fit matching parts it is essential that stop blocks be clamped on the miter attachment and that the ripping fence be set for accurate width of pieces.

3. A feather board is partial insurance against injury and renders more accurate cuts.

4. Never saw to a line without using a piece of scrap for testing the setup. After the test shows the adjustments to be correct you may run all similar pieces through on the same setting.

5. The accuracy with which the mating parts fit together determines the neatness and strength of the chest. This in turn is no better than the accuracy of your measurement and the degree of accuracy in making your adjustments. Don't run your work through the saw until you are completely satisfied that you cannot adjust the equipment more accurately.

6. Because the pieces are small and guards cannot be used on all cuts, extreme care and full attention are essential for safety in the construction of this project. Look for possible points of danger before turning on the power.

SPOOL HOLDER

J. HOWARD WADDELL
Instructor of Industrial Arts
Calvin Coolidge High School
Washington, D. C.

The spool rack described herein is a very convenient storage and display space for thread for the sewing room in the home. It holds 54 spools with every one readily accessible for comparison and selection. It also makes an interesting shop project. The varied operations furnish a wide experience to the student and yet only a small amount of material is required.

BILL OF MATERIALS

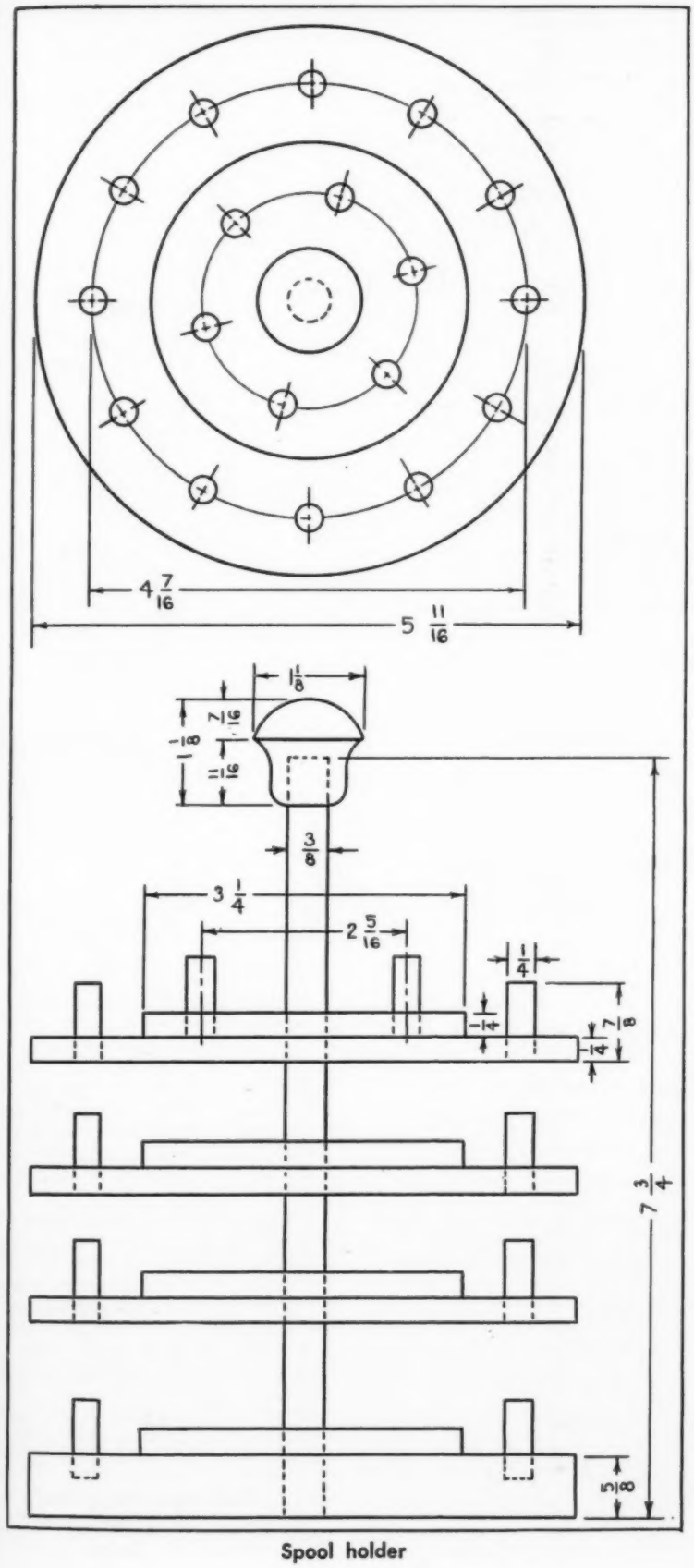
No. of pcs.	*Name*	*Size*
1	Base	$\frac{5}{8}$ x $5\frac{11}{16}$ x $5\frac{11}{16}$ in.
3	Large disks	$\frac{1}{4}$ x $5\frac{11}{16}$ x $5\frac{11}{16}$ in.
4	Small disks	$\frac{1}{4}$ x $3\frac{1}{4}$ x $3\frac{1}{4}$ in.
54	Pegs	$\frac{1}{4}$ x $\frac{7}{8}$ dowels
1	Center post	$\frac{5}{8}$ x $7\frac{3}{4}$ dowel
1	Knob	$1\frac{1}{8}$ x $1\frac{1}{8}$ x $1\frac{1}{8}$ in.

Method of Procedure

I. *Base* — 1 pc. $\frac{5}{8}$ by $5\frac{11}{16}$ in. diameter.
Disks — 3 pcs. $\frac{1}{4}$ by $5\frac{11}{16}$ in. diameter plywood.

1. Lay out with compass set for $2\frac{27}{32}$-in. radius.
2. Cut out the disks.
3. Lay out for peg holes on top disk only.
4. Drill hole in center of each piece. Use 6*d*. finish nail with head cut off for bit.
5. Use 6*d*. finish nail through the four pieces to hold them concentric and drive two No. 20 brads to hold them together.
6. Set $\frac{1}{4}$-in. drill bit to stop $\frac{3}{8}$ in. from table.
7. Bore peg holes.
8. Take disks apart.
9. Surface all over.

Spool holder



Spool holder

II. *Supporting Disks* — 4 pcs. ¼ by 3¼ diameter round plywood.

1. Lay out and cut round to 3¼ diameter.
2. Lay out and bore peg holes in top supporting disk only.
3. Bore center holes with 6*d*. finish nail.
4. Surface all over.

III. *Center Dowel* — ⅜ diameter by 7¾ in. long.

1. Lay off and cut to length.

IV. *Spool Pegs* — 54 pcs. ¼ by ⅞-in. dowel.

1. From a length of ¼-in. dowel, cut 54 pieces ⅞ in. long.
2. Surface and chamfer ends slightly.

V. *Handle* — 1 pc. 1⅛ diameter spherical or other shape. This may be turned on a lathe or a spool may be sawed in half and one end used. Bore hole to fit center dowel (after it has been sanded for clearance) 7/16 in. deep.

VI. *Assembling* —

1. Glue supporting disks to the large disks and base, using a 6*d*. finish nail to keep the holes in alignment.
2. Bore the ⅜-in. holes.

NOTE — These center holes in the disks may be bored 1/32 over size instead of sanding the dowel down for clearance.

3. Glue the center dowel into the base.
4. Sand center dowel for 1/32 clearance.
5. Glue spool pegs in the holes.

NOTE — Do not glue handle on top of center dowel until finishing is done.

VII. *Finish* — The finish is optional.

TURTLE PINCUSHION

ROLLAND A. HOEHN, JR.

Junior High School

East St. Louis, Ill.

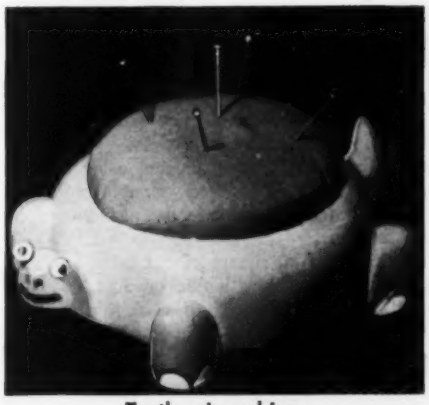
The making of this turtle pincushion gives the student an opportunity to acquaint himself with some of the basic principles of amateur whittling.

The drawing and photograph show how to make this project.

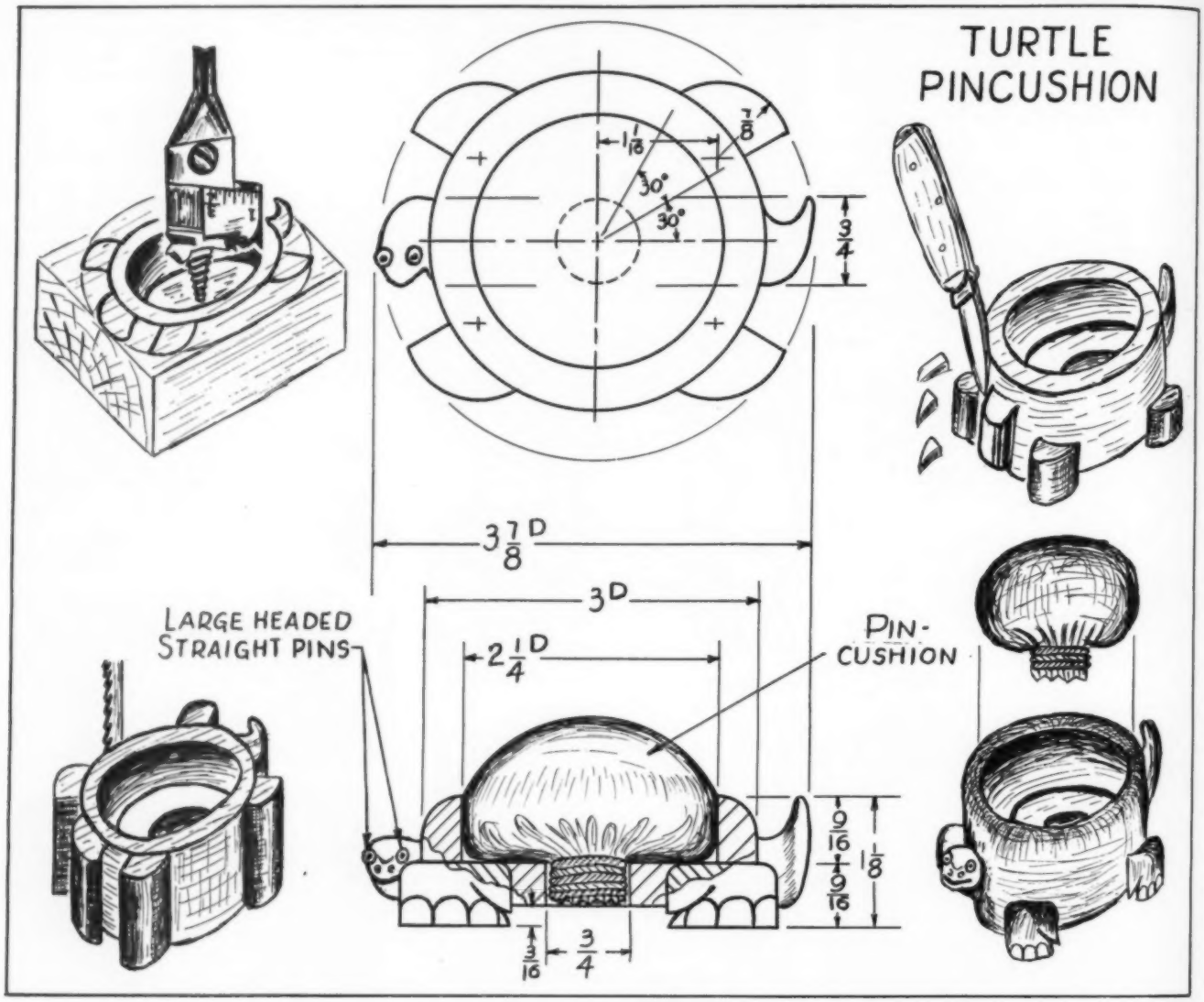
Method of Procedure

Turtle:

1. Select suitable piece of soft white pine approximately 1⅛ by 4 by 4 in.
2. Transfer top view to wood.



Turtle pincushion



Details of turtle pincushion

3. Bore 2¼-in. hole halfway through block as shown.

4. Bore ¾-in. hole through bottom of block.

5. Jigsaw outline of turtle.

6. Whittle legs 9/16 in. down from top of turtle, and shape and round off; feet may be detailed as shown.

7. Whittle head and tail 9/16 in. from top and round them off.

8. Smooth with sandpaper and finish with any of the following materials: (*a*) enamel and wax, or (*b*) apply enamel using it as a stain and rub off to show grain of wood, or (*c*) stain with oil or water stain and varnish.

Pincushion:

9. Select 5-in. square of red gabardine and pack center of it with fine sawdust.

10. Gather ends of cloth, work sawdust into hard ball, and tie ends of cloth with stout cord.

11. Fasten sawdust bag into turtle with good grade of wood or cloth glue.

WIRE MEASURING AND COIL WINDING DEVICE

JOSEPH J. LUKOWITZ

Milwaukee, Wis.

In the construction of electrical projects in electric shop classes the handling of long lengths of wire for coil winding presents a troublesome problem which can become extremely annoying.

Figure 1 shows a simple and very practical solution of this difficulty. The wire to be measured is merely looped once around the measuring wheel shown at *A* and *B*, and the end slipped through a hole in the boy's individual supply reel shown at *C*. The supply reel is placed in a hand drill which in turn is held in a hand drill holder shown at *D*. The hand drill holder is held in a vise or it is clamped to a bench.

To measure the wire and at the same time wind it on the boy's individual supply reel, merely take a reading of the counter and then turn the hand drill until the counter registers the required number of feet of wire. One revolution of the measuring wheel measures one foot of wire.

Instead of a production counter the tripping pin could be arranged to trip a spring thus making a loud click at each revolution or the spring could be arranged to ring a bell at each revolution. In this case a larger diameter could be used for the measuring wheel if desired. This would require fewer revolutions of the wheel to measure a given amount of wire.

No dimensions are given for the hand drill holder. One must be designed to accommodate the particular hand drill in the shop.

Individual Supply Reel

The construction of the individual supply reel is shown at *C*. The hub of the reel is

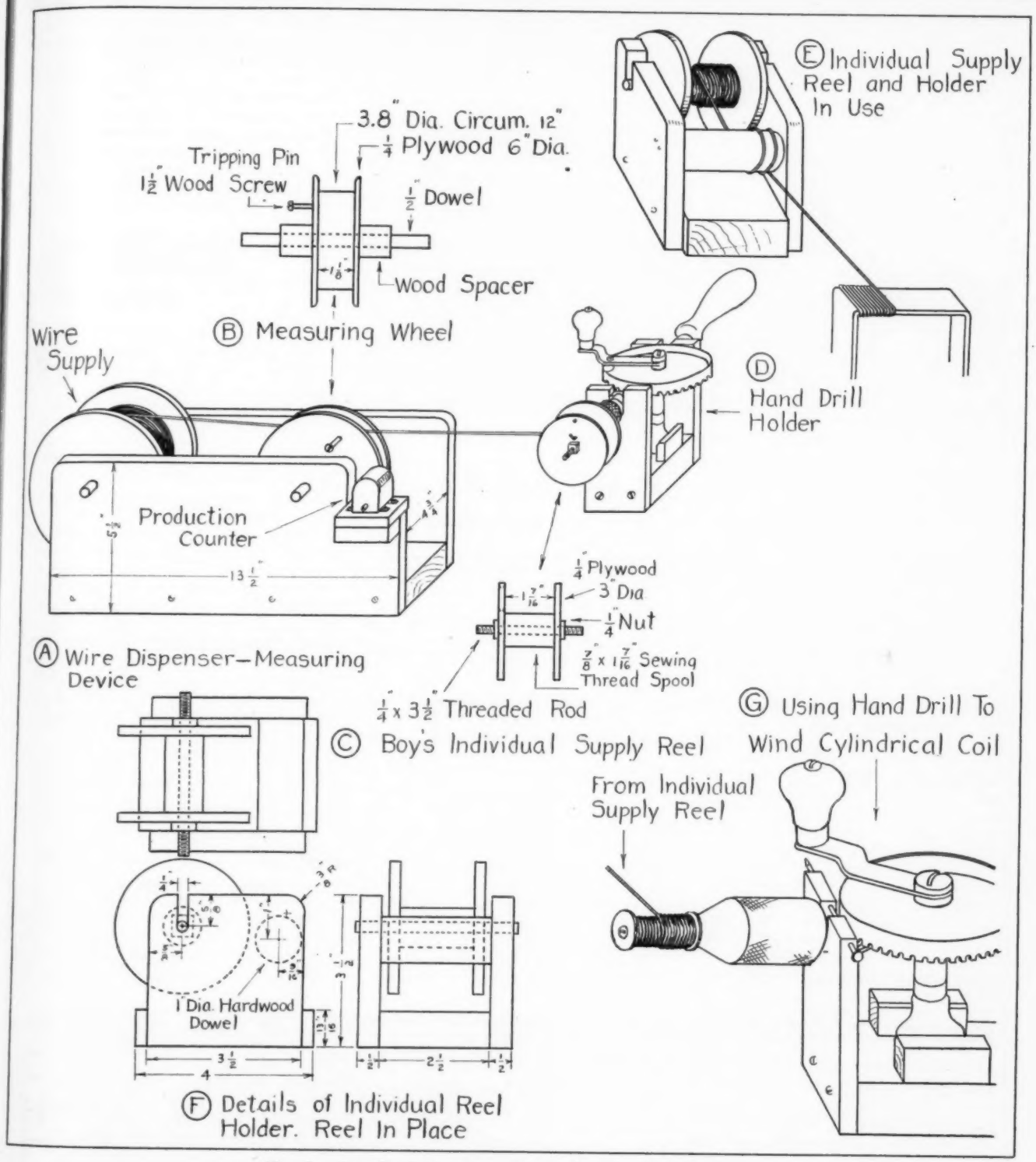


Fig. 1. Details of wire measuring and coil winding device

made from a thread spool. Cut the flanges off the spool. Do not saw off the ends of the spool to remove the flanges. The flanges can be removed with a chisel or with a disk sander. When assembling the reel apply glue to the spool ends. Drill a small hole through the plywood flange of the reel near the hub through which the end of the wire may be inserted. Another hole close to the outer edge of the flange will prove useful for holding the other end of the wire in case the reel is put away between class periods with wire on the reel. File the extreme sharpness off the threaded rod ends.

Reel Holder

At *E* is shown a reel holder in use. It is held in a vise or clamped to a bench. Notice

that the reel is mounted in the holder so that the wire comes over the top of the reel and is threaded under the dowel. This will prevent the reel from working up out of the holder. The dowel in the reel holder does not turn. Wind the wire twice around the dowel as shown to obtain tension on the wire so that a tight coil will be wound. At *E* a toy motor field coil is being wound. The field coil is held in the hands and revolved in the winding process.

CAUTION: When winding the wire around the dowel wind it in spiral fashion otherwise the wire may lock in position. To maintain the turns in spiral relationship around the dowel during the winding of the coil always pull the wire to one side of the holder as shown by *E*.

More or less tension can be attained by winding more of fewer turns of wire around the dowel. At *G* is shown a method of winding cylindrical coils with the aid of a hand drill and holder. When winding this type of coil do not wind the wire around the dowel to obtain tension. Tension can be obtained with the hand as it guides the turns on the coil.

The hand drill held in the hand drill holder is also very useful in polishing commutators of toy motors. To use the hand drill for this purpose insert the motor shaft in the chuck of the hand drill and revolve the hand drill at the same time holding a piece of sandpaper against the revolving commutator.

PLATE HANGER

CHRIS H. GRONEMAN
Industrial Education Department
The A & M College of Texas
College Station, Tex.

Interior decorators frequently use hangers of the type shown here made from Plexiglas or Lucite, to display choice pieces of china. A minimum of material is used for this hanger, but great care must be exercised in forming the different parts as shown in the drawing. The results will be worth the extra effort.

Perhaps there is a dominant color scheme in the room where this plastic hanger is to be used, and in this event, the craftsman might wish to tint it to harmonize, for the tips of the holder are visible around the curve of the china piece. Another idea would be to tint the plastic to match the outstanding hue of the piece it is holding.

The fact that this hanger is adjustable makes it even more serviceable.

BILL OF MATERIAL

Quantity	*Name*	*Material*	*Size*
1	Lower part	Plastic	⅛ x 1⅜ x 9½
1	Upper part	Plastic	⅛ x 1⅜ x 6⅛
		Plastic dye	

Procedure

1. Lay out all parts on Plexiglas or Lucite.
2. Cut out the parts with a coping, jig, or band saw.
3. File the edges.
4. Sand the edges.

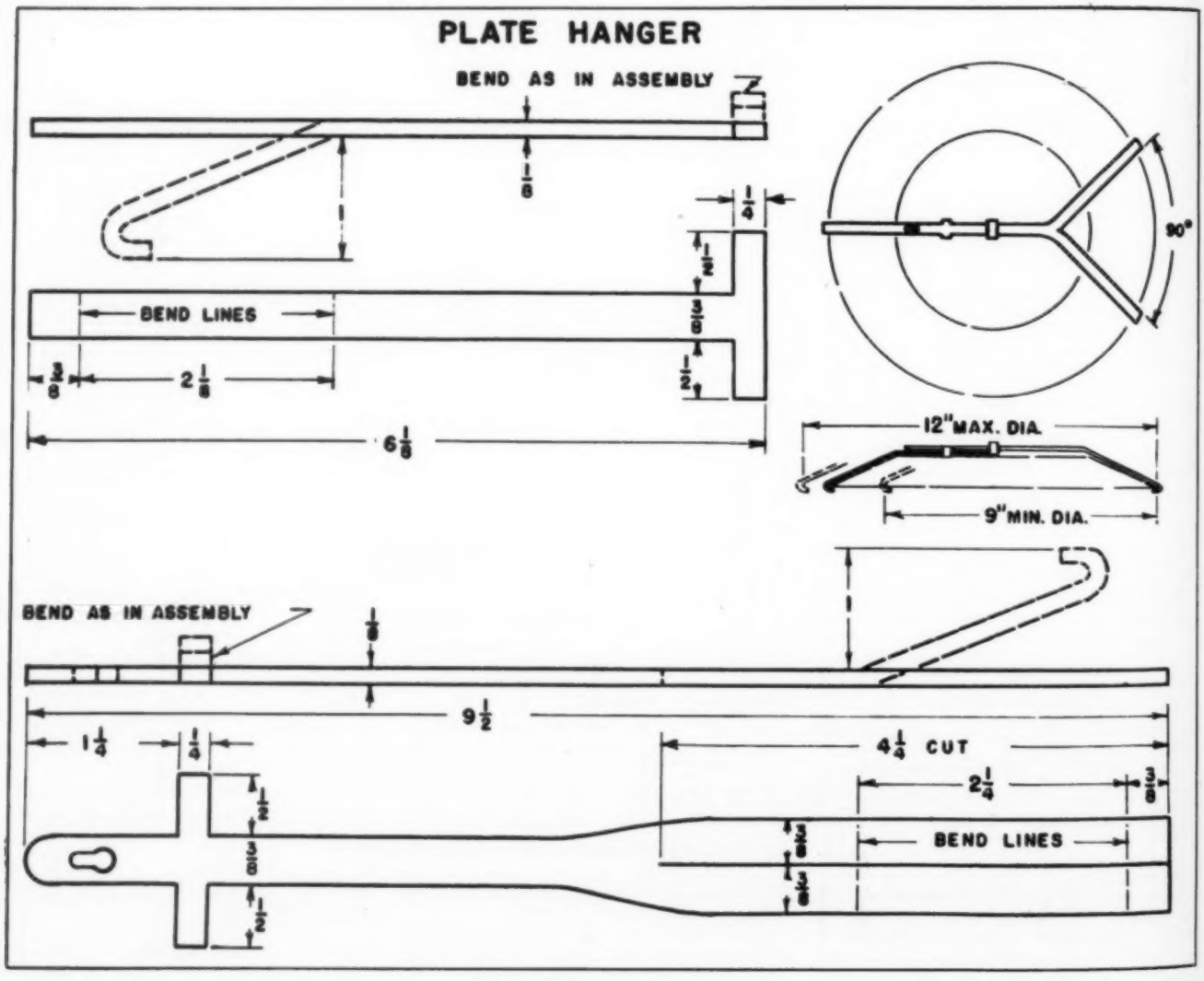


Plate hanger by Groneman

5. Mark and saw the slit in the body piece.

6. Heat and bend the parts as shown in the drawing. A plate makes an excellent form to bend around.

7. File and sand the inside of the slit.

8. Heat ¼ by ½-in. body flanges on both pieces; place body pieces in proper alignment and bend the flanges around the body pieces.

9. Tint if desired.

10. Apply a coat of wax and polish with a soft cloth.

TEACHING INSPECTION PROCEDURE

KARL F. KIRCHHOFER

New York City

The inspection department in every metalworking plant and the position of chief inspector have risen so rapidly in importance that many vocational schools and high schools with machine-shop training courses have established a department for training inspectors.

During the war there was such a sad lack of experienced and capable inspectors for metalworking plants, government arsenals, Navy Yards, tool and die shops, and other plants that the government, state, and municipal schools and private institutions hastily set up training courses to produce quickly the vast army of inspectors necessary to maintain the extremely close tolerance work so vitally essential in war production.

Today inspection, quality control, and keen supervision over work in process is an established procedure in all plants working to close tolerances, and thus it is altogether fitting that every machine-shop instructor devote a portion of his course of instruction to the teaching of correct inspection procedure. In this series of articles we endeavor to point out in simple, everyday language up-to-date methods employed by leading firms so that when the student emerges from the classroom and is ready to enter the field of mechanics, tool- and diemaking, and other phases of shopwork, he will already be an experienced inspector and his opportunities for success in his chosen field will be greater than if he had never received this training.

One of the factors that may have deterred many school shops from previously setting up an inspection course has been the comparatively large investment required for the original equipment. This situation has been overcome by at least one manufacturer who has brought out what he terms "A Limited Budget Inspection Laboratory" and has been designed for use in school inspection courses. The same type of equipment is already in daily use in thousands of factories, and thus when the student finds a job in metalworking and enters the inspection department he is already familiar with this equipment by dint of long practice in the classroom.

We will discuss the various components that make up this suggested laboratory and methods of teaching as we proceed.

To start with, no school shop should endeavor to teach precision or inspection technique without the use of a set of gauge blocks, those rectangular pieces of steel that have been finished to an accuracy of millionths of an inch, gauges that are so very important in controlling the dimensions of thousands of articles normally produced by industrial plants. In years past the price of a set of gauge blocks has been out of the reach of the small school shop's budget. This also has been changed. It is not necessary for the small school machine shop with a limited budget to purchase a set of blocks costing several hundreds of dollars. There is available on the market now a small nine block set which may be obtained for less than $20 and is perfectly suitable for teaching students the use and care of gauge blocks, the manner in which combinations of blocks are used to reach various dimensions, and to learn the proper assembling and wringing technique.

Fig. 2. View of limited budget inspection laboratory

The small nine block set will enable one to make up 331 different combinations. This small set has achieved astonishing popularity and has brought the price of gauge blocks within the means of the average tool- and diemaker who previously could never dream of ever owning his own set of gauges. Naturally, it would be preferable to have a set of gauge blocks that contains gauges in the ten thousandths series so that the student will learn how to make up combinations in tenths which are so common in our shops today. As every machine-shop instructor knows gauge blocks are used not only singly for checking and setting micrometers, but also in combinations made up by wringing the blocks together. To obtain the size .7312 in., for example, he selects the number of blocks required to reach this dimension. The accepted shop procedure in wringing together various combinations is to eliminate the last figure first. For example to make up .7312 first write the figure on a piece of paper, deduct .1002, .131 and .500 blocks from the set, wring them together in the proper manner and you'll reach .7312 the dimension required for your job. Every student should be familiar with the correct handling, use, and care of gauge blocks. All gauge manufacturers in the country have available literature which goes into great detail on gauge block use. Here we will cover the correct wringing process very briefly.

To wring a combination of gauge blocks together, first remove the correct blocks from the case and clean carefully. Use a very soft cloth or tissue and be extremely careful that

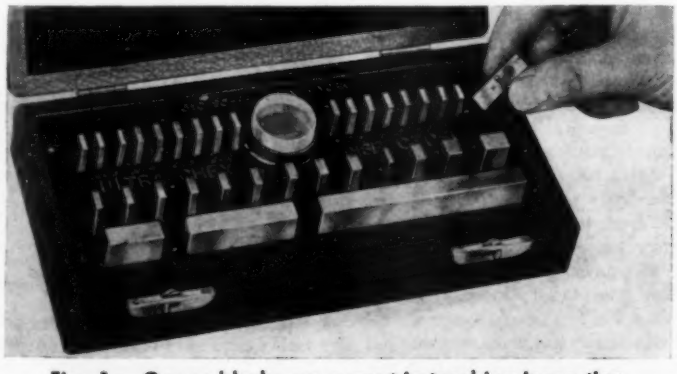


Fig. 1. Gauge blocks are a must in teaching inspection

Fig. 3. Gauge block utility set in holder, and used as a snap gauge

no grit of any kind remains on the block surfaces. Then, most toolmakers and inspectors slide the blocks slightly over the wrists or lower forearm. This sliding gives the surface of the blocks a thin coating of oil which aids the wringing process. After the blocks have been cleaned the measuring surfaces are brought into contact in such a way that the corners of the blocks do not touch. Blocks must then be slid against each other with a slow circular motion. Immediately, a gripping pressure will be sensed and the wringing is completed by sliding the blocks into position so that the full surface of one is covered by the entire surface of the block next to it.

In conjunction with gauge blocks, we must also consider the gauge block utility set. Every student in the school shop will eventually need some knowledge and experience with these accessories if he is going to do any accurate work.

The gauge block utility set has been designed with accessories that enable the mechanic to actually apply the millionths accuracy of gauge blocks to the work under inspection. While today these shopmen may be more accustomed to the conventional measuring tools such as vernier height gauges, inside and outside micrometers, snap gauges and other tools, it is a fact that the gauge block utility set will give you a more accurate height gauge, will provide for closer measurements for inside work, and a more dependable snap gauge for certain classes of work. Therefore, the student should gain as much facility with the use of the gauge block utility set as he will with the more commonly used tools.

The gauge block utility set consists of three or four holders, trammel points, jaws, scriber, and sometimes longer extension jaws. In actual shop practice when using the gauge holders, it is necessary first to wring blocks together as described above, then place the setup inside the holder, clamp and bring the surfaces of the blocks into contact with the two pairs of jaws that have been inserted. Since the jaws are very accurately lapped they are in effect an extension of the gauge blocks themselves and wring to the blocks with the same cohesive force. When used as in Figure 3 an extremely accurate snap gauge is produced which may be employed for checking a small number of pieces when the production is not large enough to warrant the manufacture of special gauges or the purchase of adjustable limit snap gauges.

This is the only practical way to hold a series of blocks that must be taken to the work for measuring because the strength of cohesion is not sufficient to hold a group of wrung blocks together when they are brought into contact with a die, fixture, tool, or workpiece.

Each utility set comes with a height gauge base so that any combination of blocks may be inserted in the gauge holder, set upright upon the base and used as a practical height gauge for scribing lines, determining and proving locations and spotting for drilling and boring. On the top of the base there is a steel block set in, which is hardened, ground, and lapped to a flatness and parallelism that compares with the gauge block surfaces. Thus, when the blocks are stood upright on the base they are square and parallel and produce an extremely accurate height gauge.

The utility set is also equipped with jaws for internal measuring. The measuring of inside diameters to extremely close limits has long been a serious inspection problem. There are various devices for this purpose and they are satisfactory to certain standards of accuracy. The combination held by the gauge holder and jaws can be used to measure ring gauges, bores, inside diameters of cylinders to $\frac{1}{10,000}$ inch by the experienced operator, and it is to obtain this experience that we recommend the instructor equip the school shop with the gauge block utility set.

To get right down to fundamentals in measuring and inspection we must come to the micrometer. Of course, everyone knows that the micrometer is essential to every student of machine-shop work. The instructor should encourage each student to purchase, own, and measure constantly with his individual micrometer. Furtherfore, with tolerances as close as they are today, the student must have a micrometer graduated not only to thousandths of an inch but also to tenths of thousandths.

Fortunately for the limited budget of most students it is not necessary to pay $15 for a micrometer measuring by vernier to tenths of thousandths. There is one nationally known manufacturer making tools for over thirty years who specializes in a student micrometer with vernier to tenths that may be purchased for much less than this amount. This micrometer comes without locknut or ratchet for sooner or later the student will probably not use the ratchet anyway. Like all good toolmakers and mechanics he is going to develop his own sense of feel, of measuring skill, and it is a good idea, to start working on this skill in his student days. Nevertheless, micrometers with locknut and ratchet are probably more widely purchased than plain tools since many machinists use the locknut feature for locking at certain settings.

The next step is to encourage machine-shop students to use their micrometers in every conceivable way, day after day, at home, and in the classroom. Tell them to carry their micrometers with them constantly and measure the common things at home such as the thickness of a knife blade, the outside diameter of a curtain rod, the width of a pen point, anything so long as they develop a sense of feel and ease and quickness in reading. The latter, incidentally, may be very helpful in obtaining positions for your machine-shop students, because no shop superintendent or works manager is going to hire a machinist or lathe operator who fumbles and hesitates over the reading of his micrometer. To go further, it is good practice to put on measuring contests. These can be fascinating and instructive. Just take a cylindrical ground piece that has tolerances within tenths. Have eight or ten students

Fig. 4. Closing micrometer on optical parallel to determine flatness and parallelism

measure it, reading by vernier in tenths of thousandths. Let each one write his result on a slip of paper with his signature. Then, set up the Comparitol covered later in this series, with gauge blocks. Measure this to ⅒,₀₀₀ in. You will undoubtedly be surprised at the number of results that have been obtained in the measuring of this simple ground piece of work, varying by as much as a few tenths and all depending upon whether the student has a heavy or light touch.

In conjunction with micrometers, it is well to teach the student how to check and set his micrometer employing optical parallels and gauge blocks. It is very interesting to give every individually owned micrometer used by the students in the school shop the optical parallel test. This is similar to one of the steps that micrometers must pass before leaving the manufacturer's inspection department. To diverge briefly, optical flats are glass disks manufactured of special optical glass, pyrex or quartz. The two surfaces have been ground and polished so that they are exactly plane and parallel. This is true of optical parallels but is not necessarily true of optical flats which have surfaces that are exactly plane but not necessarily parallel to each other.

The application of the optical parallel may be explained by dwelling upon the phenomenon of light interference. It is not within the scope of this article to delve deeply into light bands and measurements but complete scientific data may easily be obtained from any library or encyclopedia. We are concerned here primarily with the application of an optical parallel to micrometer anvils and spindles. It is, of course, a common practice to check the lead accuracy of micrometers with gauge blocks to make sure that they are accurate enough to measure tenths of thousandths. However, many plants have found that this is not enough. Anvil and spindle must also be checked for parallelism, and this is accomplished by closing the micrometer on the optical parallel as shown in Figure 4. Unless light wave bands appear on both anvils when tested with the optical parallel, the measuring surface of anvil and spindle may be out of parallel sufficiently to make the micrometer unsuitable for measuring in tenths of thousandths.

There are also available sets of two and four optical parallels, the thickness of which will vary by ½ or ¼ turn of the micrometer screw. Micrometer manufacturers themselves generally use a set of four, about ½ in. thick and about .0063 in. variation in thickness, and another set of four about 1 in. thick also about .0063 in. variation in thickness. Since one complete turn of the micrometer screw is .025 in., it is easily understood that the above dimensions represent ¼ turn. This sort of inspection is necessary for the highest precision requirements because the anvils may be parallel in one position only in which they were originally lapped and out of parallel in others.

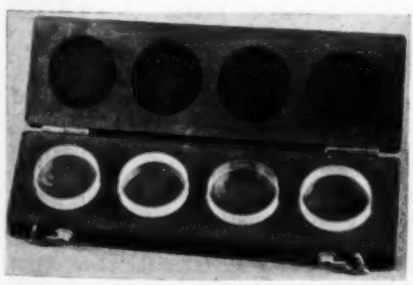


Fig. 5. Set of four optical parallels used to check micrometer anvil and spindle

Fig. 6. Inspector working with Comparitol and gauge blocks

While it is agreed that the student will not come into contact with optical parallels every working day of his life, it is nevertheless wise for him to be fully informed of their uses since it may well earn for him a position some day as a micrometer inspector in a large plant. A number of metalworking organizations periodically inspect the micrometers of their machine operators and inspectors by means of gauge blocks and optical parallels.

The optical parallel test will also show how anvil and spindle of each micrometer are wearing. Generally after a micrometer has been in use for any length of time, the outer part of the anvil will wear and thus when tested with the optical parallel no light bands would show up on the worn part. When this condition exists, it is necessary to relap anvil and spindle to be assured of a parallel surface. It is simple to understand how important it is to inspect and check micrometers regularly for if the measuring tool itself is inaccurate or faulty in any way, one cannot be expected to turn out the most accurate work.

To return to essential articles required in the "Limited Budget Inspection Laboratory" designed for the school shop, we must consider a Comparitol. See Figure 6. Every student of machine-shop practice and metalworking technique will come into frequent contact with comparators both mechanical and optical throughout his toolmaking and manufacturing career. We wish to devote some space here to the mechanical comparator such as shown in illustration. This particular instrument, known as the Comparitol, has a measuring range of .002 in. plus and .002 in. minus and is graduated to read to ⅒,₀₀₀ in. Here we refer again to gauge blocks to set up the mechanical comparator for size. This and similar tools are widely used wherever it is necessary to maintain tolerances of ⅒,₀₀₀ in. or even closer if necessary. An instrument like this provides an easier, faster, and more dependable method for making inspections than the use of micrometers, snap gauges, and similar measuring instruments, and they are much more accurate.

Every student studying inspection methods should become adept in quickly setting up a comparator to the proper size required with gauge block combinations or master setting gauges. A mechanical comparator, while primarily an inspection tool, is frequently used in the plant itself right near the grinders so that the machine operator can check the accuracy of his work as it comes off the grinding machine. This is sound shop practice and a great advance over methods previously used and possibly still being employed in smaller plants whereby the work is produced, spot checked with the machine operator's micrometer, and then only inspected with comparators in the inspection department. There are plants in the country today that have dozens

of mechanical comparators placed in strategic places all over the plant and in some instances having one tool for each machine in conformance with the present practice of checking at the source of the trouble before large quantities of over- or undersized parts have been produced. While there is no great element of skill required in the mass production checking of identical parts, yet the machine-shop student must obtain some hours of practical experience working with this instrument.

It is also important that a rigid control be maintained over all gauges and in the case of plug gauges that have seen much use, the inspector can tell quickly with the use of the Comparitol whether the gauge is out of round,

Fig. 7. New type pyrex brand glass opti-flat surface plate

by tightening the clamping screw. The final adjustment is made by turning the knurled collar below the table and moving the table to bring the point to zero on the scale. After practice, the student will find that it takes only a fraction of a minute to make the setting and the tool is then ready for checking a single gauge or tool or any quantity of mass produced parts to specific tolerances.

We now come to another member of the "Limited Budget Inspection Laboratory," namely, the instrument that is variously known as a contour projector, optical comparator, or shadowgraph. The projector as we will call it from this point on, is distinctly an American contribution to the art of precision gauging. Today its use is world wide and inspectors and mechanics by the thousands check countless millions of pieces, parts, gauges, tools, gears, thread, and every conceivable shape and form by means of this versatile and virtually indispensable measuring and comparing instrument. No machine-shop instructor should endeavor to get along without a projector and, once it has been installed, you will soon see the reasons why. The importance of inspection by projection in the manufacturing plant is thoroughly proved by the fact that this method has been adopted by virtually all branches of the metal-working industry and in other lines as well. Here is an optical inspection device that will aid in avoiding rejections of all kinds. It

31¼, 50, 62½, or a 100 times, depending upon the instrument used.

In practice, the work is placed upon the stage and compared with a drawing made to scale. The introduction of lower priced projectors has been a boon not only to thousands of small machine shops but also to the smaller school shop that could not afford to spend a couple of thousand dollars for other types of projectors.

The projector is an ideal instrument for the rapid accurate inspection of form tools, dies, punches, templets, gauges, screw threads, small gears, and other irregularly shaped pieces and parts. Manufacturers of firearms, ammunition, watches, clocks, typewriters, adding machines, radio tubes, cans, and practically every type of product requiring fairly accurate work use the projector and that is one outstanding reason why every student of machine-shop work should be thoroughly trained in setting up and using the projector.

The chart alongside shows various important parts of one instrument on the market. This particular instrument is of vertical design and has a horizontal stage on which work of a flat nature is simply laid, directly in the vertical beam of light without requiring any fixtures or other means of holding it in place.

It also has a horizontal screen on which the enlarged image is shown directly before the observer.

One feature is the fact that the lenses of

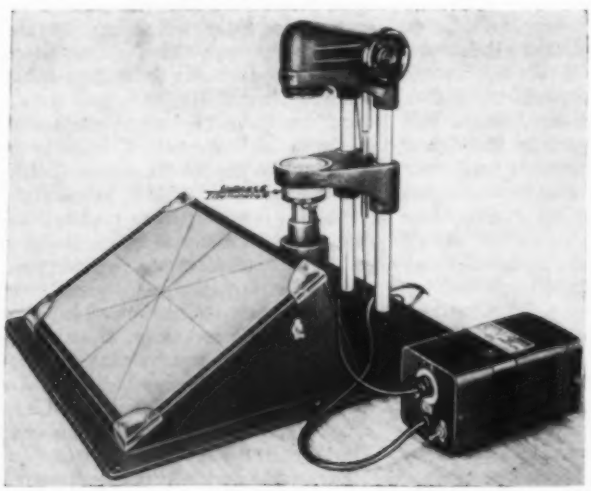


Fig. 8. Vertical type of projector showing surface illuminator

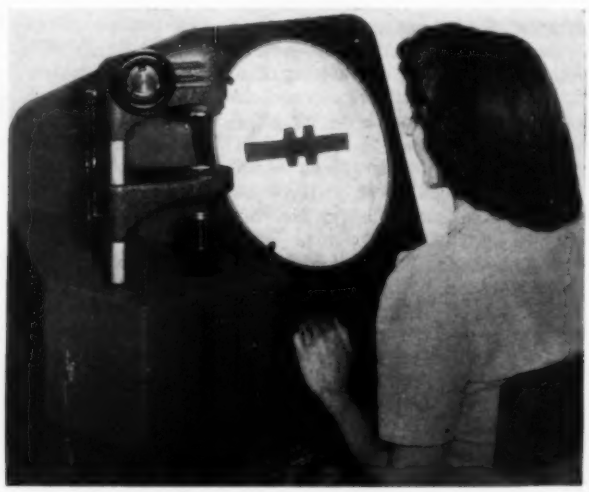


Fig. 9. Recently developed horizontal production projector

has worn under size, or has any other defects that may affect the gauging of holes. A mechanical instrument like the Comparitol illustrated has no electric bulbs, transformers, or other electric elements. Setting the Comparitol for any particular measurement is a simple operation. A standard gauge block or cylindrical plug gauge is placed on the table. A quick rough adjustment is then made by sliding the measuring head along the column to bring the feeler point to the top of the block. The bracket is then locked in position

makes possible more positive inspection by eliminating the uncertain human element of *feel* which is always present when gauges of various kinds requiring the use of the mechanic's skill are employed.

A projector enables one to see on a greatly enlarged image exactly where tools, cutters, form tools, and gauges vary from the dimensions specified by the prints. The projector is also the perfect instrument for training students to detect errors very rapidly. Actually the student sees the error magnified 10, 20,

various magnifications may be interchanged quickly without readjustment.

The student will readily absorb the principles of inspection with this simple type of projector. He will also find it interesting to work with the micrometer cross slide for making actual measurements on the work. This measuring stage takes the place of the ground glass table upon which the work is ordinarily placed. There are double cross slides of bronze mounted on roller bearings. As shown by the illustration, each slide con-

Fig. 10. Gear tester

tacts a precision micrometer under spring pressure. Gauge blocks may be inserted between the micrometer faces and the contact buttons in the slides.

Shown mounted on top of the micrometer cross slide is a center support which is used for holding work between centers. To increase the usefulness of the center support for thread measurements, it is possible to tilt the work to the helix angle in both directions.

There is also available a surface illuminator used to study the characteristics of surfaces for the study of finish or of various designs thereon.

Many a difficult inspection and gauge problem can be handled by means of projectors and the machine-shop instructor would be well advised to make the study of the projector one of the high lights of his inspection training course.

No course on inspection can be considered complete without devoting considerable time to gears. There has been developed recently for use both on a projector and as a mechanical unit of its own, a gear tester for fine pitch instrument and clock gears. The mechanical student will certainly have something to do with gears during his life as a mechanic or superintendent and it would be well to add one or two gear testers to the school shop equipment. The device pictured is of high precision workmanship and is very useful for checking fine pitch gears. Center distance, pitch line run out, and errors occurring in gears are readily discovered. The test is made between two meshing gears or gear and pinion. There is a micrometer screw with 1-in. capacity and an extra inch may be obtained by using a gauge block which gives the tool its capacity from ⅜ to 2-in. center distance. In addition there is an indicator as shown reading to .0005.

An exclusive advantage of this gear tester is that it may be used on a standard type projector.

This is a particularly excellent feature for instructional purposes since the student can see the action of the gears, the tooth shape, back lash, in fact all the elements of gear teeth, spacing, involute, undercut, concentricity, interference in a magnified image directly on the screen.

Of course, there are various types of gear testers on the market and another one that is widely used in plants throughout the world is shown. This is a universal type gear tester used for checking spur, spiral, bevel, and worm gears and should be considered a worth-while investment in any school shop interested in gear problems. These gear testers serve the double purpose of detecting and locating faults in the manufacture and of proving the accuracy of gears when completed. They are often installed in both the gear cutting and in the inspection departments. Since gears play such an important part in our industrial economy and are used in hundreds of different products, it would be well to spend some time on gear inspection.

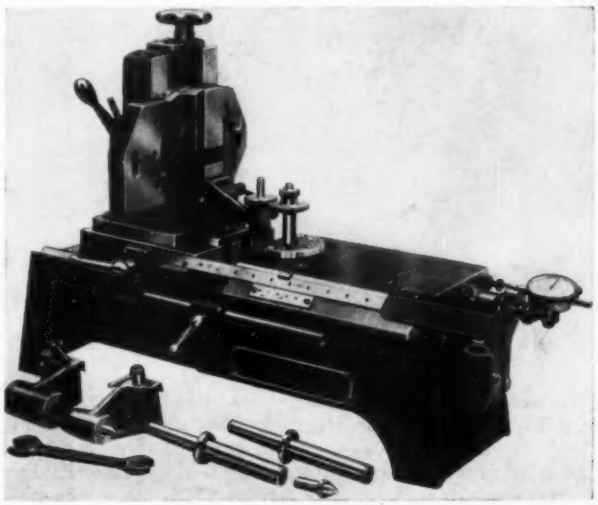


Fig. 11. Universal-type gear tester

Before going on to the Toolmaker's Microscope, one of the world's most important measuring instruments, we will mention a comparatively new product namely precision plastic comparator charts which are used on projectors. These charts are said to surpass previous methods of hand drawn charts and enable the inspection operation to be speeded up because the readings are positive and can be read accurately without calculation or guesswork. These plastic charts are of absolute stability and will not curl or warp which is a fault of drawings on paper. They are supplied to fit the various shadowgraphs and comparators on the market and would be helpful for the student who wishes to become an inspector and become acquainted with their use. They are available in the various standard magnifications and may be used to check radii, angles, thread forms, etc.

Up to the present time, it would have been difficult to fit the purchase of a toolmaker's budget and since the instrument costs $2,000 or more, it could not readily become a part of a "Limited Budget Inspection Laboratory" such as marketed by one nationally known instrument and tool company. However, an enterprising manufacturer, sensing the urgent demand and need for a moderately priced toolmaker's microscope is placing one on the market, an instrument which, it is said, will retail for less than $500, and while not as complete or universal as the large TMM may be sufficient for classroom purposes.

The toolmaker's microscope has definitely won its place in the metalworking industry, not only of the United States, but of the world. There are hundreds in use and with the addition of the new, low priced instrument, indications are that this figure will reach the thousands. The time may well come when the toolmaker's microscope will be as much a requirement in every shop, as gauge blocks are today.

Briefly, the toolmaker's microscope is a precision measuring instrument, accurate, universal, and compact for measuring and inspecting optically a tremendous variety of work such as jigs and fixtures, tools and dies, screws and thread gauges, tapers, angles, forming tools and for every type of work within its range. Unlike the projector which is essentially an instrument of comparison, the large toolmaker's microscope measures directly to $\frac{1}{10,000}$ in. One important characteristic of the instrument is that it does not depend upon the inspector's measuring feel or skill. When properly used, it gives the same results and will repeat its readings over and over again to tenths of thousandths.

The toolmaker's microscope makes microscopic precision measuring almost as simple as the use of an ordinary gauge. In the production of mass produced parts it shows visually any error or deviation from standard with a speed that makes its use essential in virtually any plant producing accurate work. The microscope is unexcelled for checking all types of cutting tools, such as taps, chasers, milling cutters, hubs, reamers, straight and circular form tools, tungsten carbide tools, and many other similar applications. Any

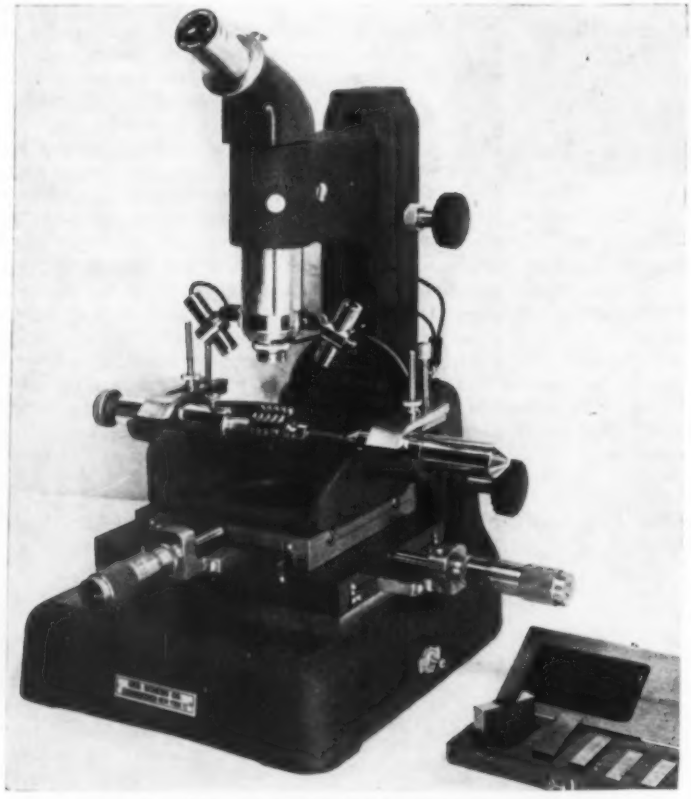


Fig. 12. New small toolmaker's microscope with range of 1 by 2 in.

possible errors or wear in cutting tools are rapidly detected and spoilage of work reduced to a minimum.

Again, the tool is important in the control of gauges and templates. It is particularly adaptable to checking thread gauges because all measurements are taken on an enlarged image of extreme sharpness which is shown magnified 30 times through the eyepiece. Actually, the student will find the instrument is really a universal measuring microscope by providing measurements in two co-ordinates. All measurements are taken not on the work but on its 30 times enlarged image, either by precision micrometers or gauge blocks using a hairline cross as reference. Similarly angles are detemined by an optical protractor in the ocular.

All measurements for form, angle, depth, lead, and diameters can be performed with the standard protractor ocular. For rapid thread comparison an interchangeable template ocular head can be furnished. When looking into the ocular, the master profile appears superimposed on the thread image and shows any deviation from standard. An instant check for correct lead of the thread is obtained by placing a gauge block into the longitudinal table movement. The upright of the instrument can be tilted to the helix angle against micrometer stops. There are numerous thread errors such as threads too sharp at minor diameter, thread at wrong angle to axis, thread bearing at root only, thread lead errors and others that are readily detected with the toolmaker's microscope. The foregoing has been a brief description of the features of the larger sized toolmaker's microscope which has a measuring range of 2 by 4 in. and measures directly to $\frac{1}{10,000}$ in.

The smaller instrument has a range of 1 by 2 in. and contains ocular with 90-deg. cross lines and 60-deg. angle lines with 1-in. micrometer reading to .0005 in. There are center cradles for holding work between centers as well as holding clamps. The small model has been developed for practical shop use, but it is ideal for classroom use so that machine-shop students will be able to practice on actual jobs and gain a working knowledge of the fundamentals of the toolmaker's microscope.

Teaching inspection procedure will assume more and more importance as time goes on for there is no question but that we will continue to advance precision-wise, which will mean greater control over inspection and quality. The alert machine-shop instructor will bend his every effort to equip his training shop with instruments, gauges, and tools like those that are actually used in industry today.

THOUGHT PROVOKERS

He who looks only for flaws shall overlook much merit. . . . When you're in the right, you can afford to keep your temper; when you're in the wrong, you can't afford to lose it. — *Tulsa Public Schools Department News*

HUMAN RELATIONS

Many opportunities for teaching human relations present themselves in our shops and laboratories.

Why not discuss with your classes from time to time those personality traits that are necessary for success? — *Tulsa Public Schools Department News*

AN IMPROVISED DRAFTING SCALE

HOWARD W. BOEKELOO
Industrial Education Department
Central High School
Kalamazoo, Mich.

In the present day of tool abundance the average boy becomes accustomed to feel, from his school experience, that a complete set of expensive tools are essential to successful drafting at home. He does not realize that in many cases there are possibilities of such work being done with inexpensive and improvised equipment, and that sometimes more depends on the ingenuity of the worker than on the tools used.

The scale shown is a substitute for the triangular architectural scale. In fact, it will do things a standard scale will not do. It may be drawn at the top of the sheet of paper above the trim edge or on a separate piece of paper. It may be used for any scale $\frac{1}{8}'' = 1$ ft., $\frac{1}{4}'' = 1$ ft., $\frac{3}{8}'' = 1$ ft., etc. The distance 0–1′, 1′–2′, 2′–3′, are drawn the length of the scale one wishes to use. Thus, if a scale of $\frac{1}{2}$ in. = 1 ft. is wanted, lay out 12 foot spaces, each one $\frac{1}{2}$ in. long on the horizontal line. See Figure 1. At the end of this line, erect a perpendicular line 1 ft. high, which in this case will be $\frac{1}{2}$ in. high.

Draw the oblique line connecting the 0 with the top of 12-in. line. Then draw the verticals and the numbers as shown. The feet may be taken off the base line with dividers; the inches are taken off the vertical lines.

This method may be used for improvising any scale, such as $\frac{5}{8}$ in. = 1 ft., $1\frac{1}{4}$ in. = 1 ft., or any other odd variety.

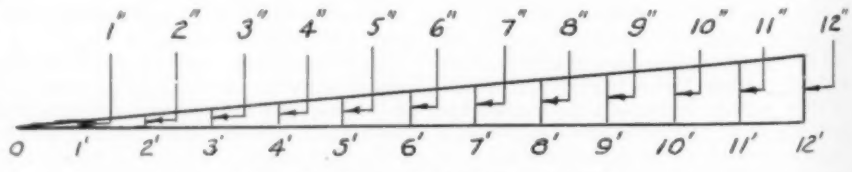
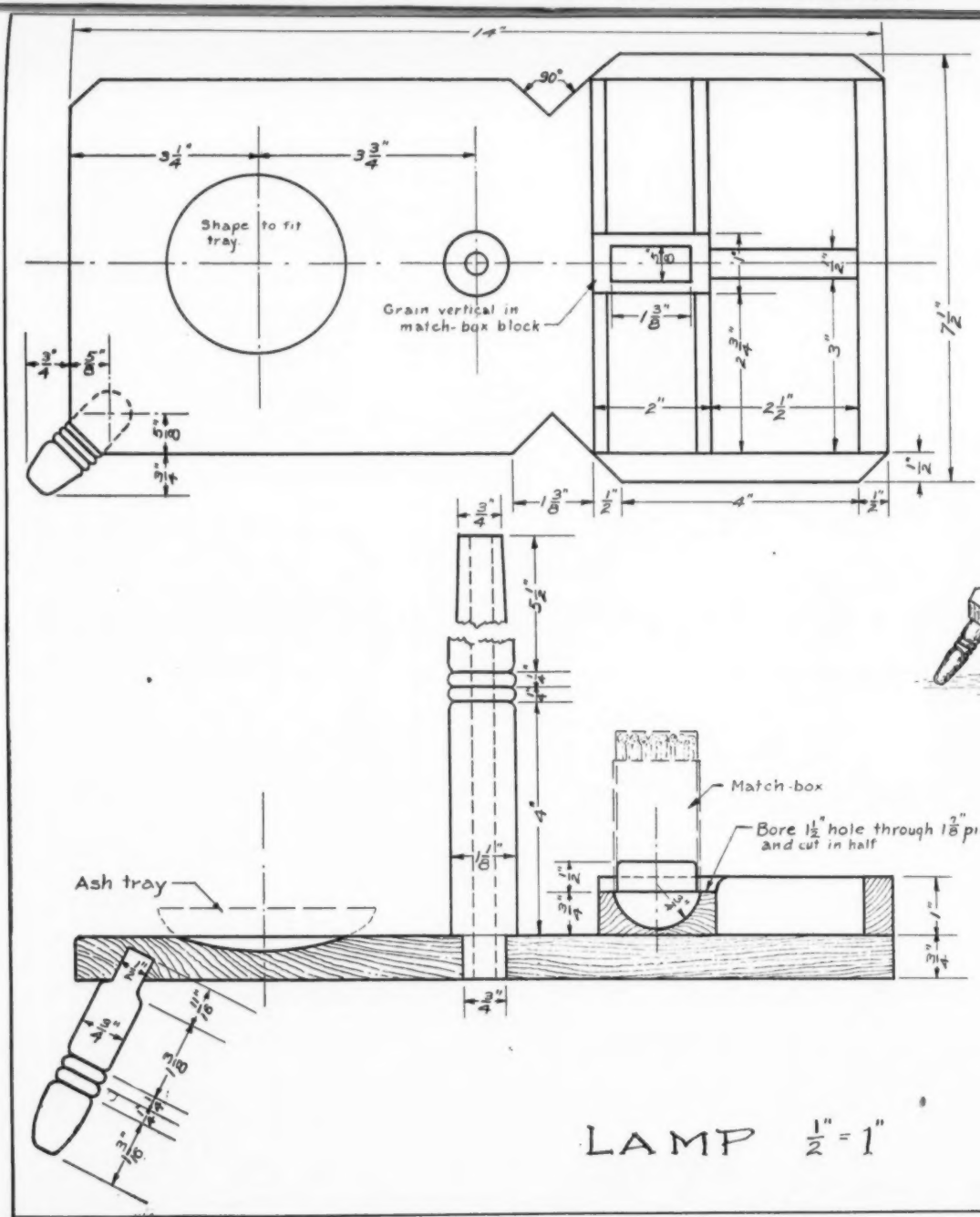
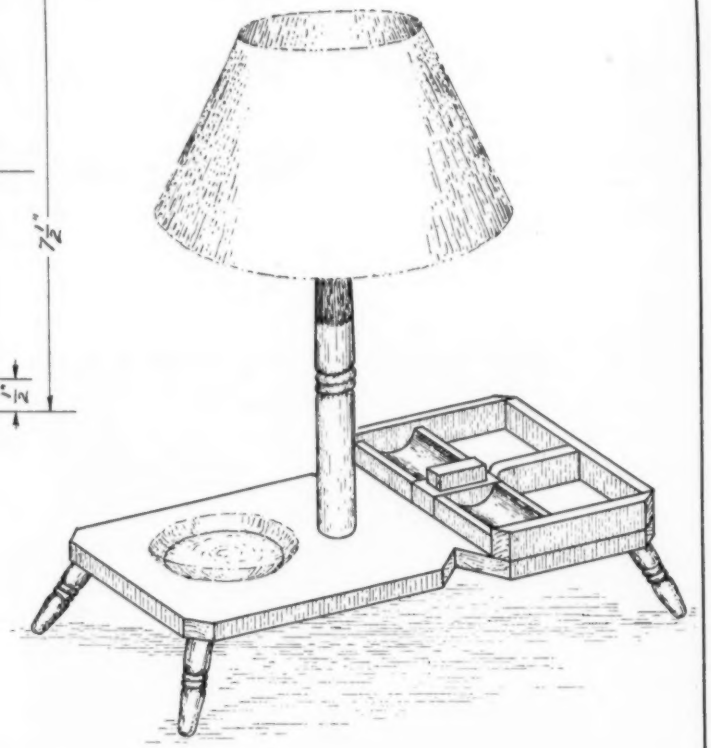


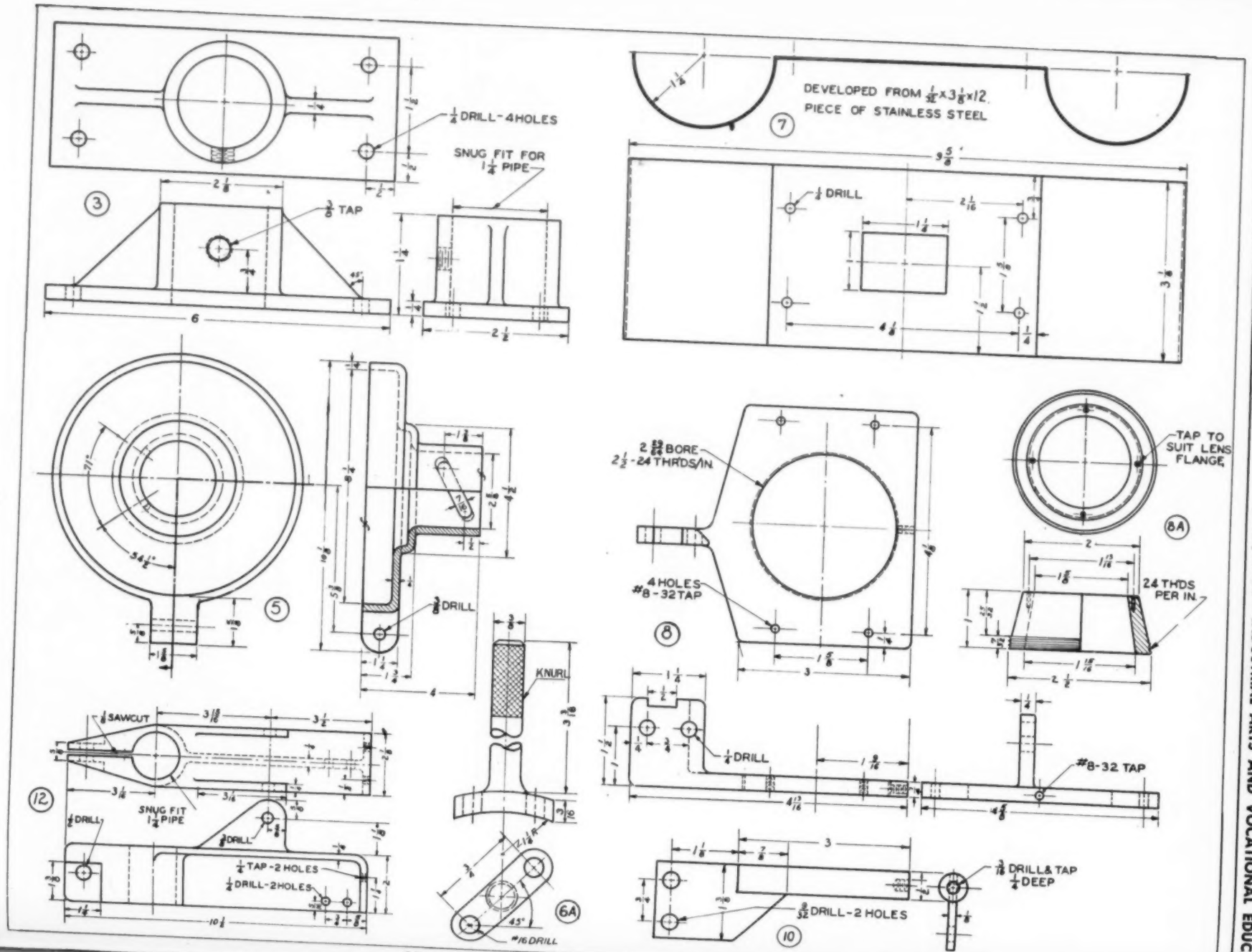
Fig. 1. Improvised drafting scale





This lamp is a miniature of the old-time cobbler's bench. It is an interesting and useful article for living room, sewing room, or child's room The tack boxes hold cigarettes and matches or pins and spools. Made of maple stained and rubbed

Electric lamp designed by R. M. Hammes, Abraham Lincoln High School, Council Bluffs, Iowa



35mm. enlarger by John Emmel. See article on page 249

35MM. ENLARGER

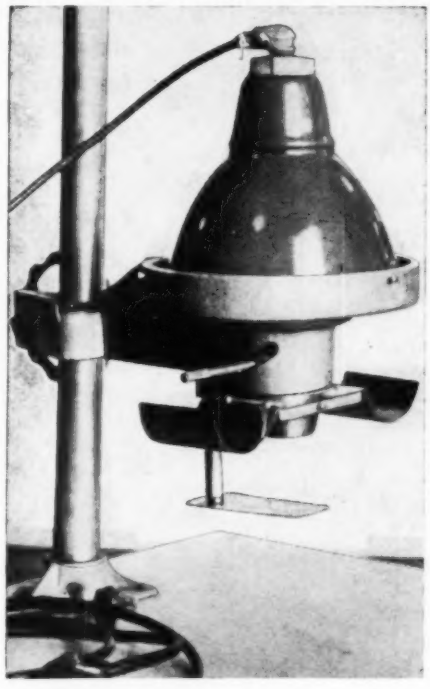
JOHN EMMEL
Connelley Vocational High School
Pittsburgh, Pa.

This enlarger is made for 35mm. film only. It involves some work in several shops — thus being a good all-round project. Pattern, machine, foundry, and electrical jobs are involved. Several pieces are purchased, and any lens of approximately 50mm. may be used. Some simplifications of commercial enlargers are used, and some original ideas are incorporated. Four patterns —all without cores, are needed, and the castings may be of iron or aluminum. With the purchase of a lens flange to suit your individual lens, none of the machining is of a precision nature. The bill of material for the one made lists the source of each piece. and the finished enlarger turns out enlargements that compare favorably with those made on expensive precision jobs. This one was made to use a Leica Elmar lens. No negative carrier is needed, as the weight of the condenser holds the negative flat against the film holder. The fillister heads of the screws holding the film holder in place act as guides for the film.

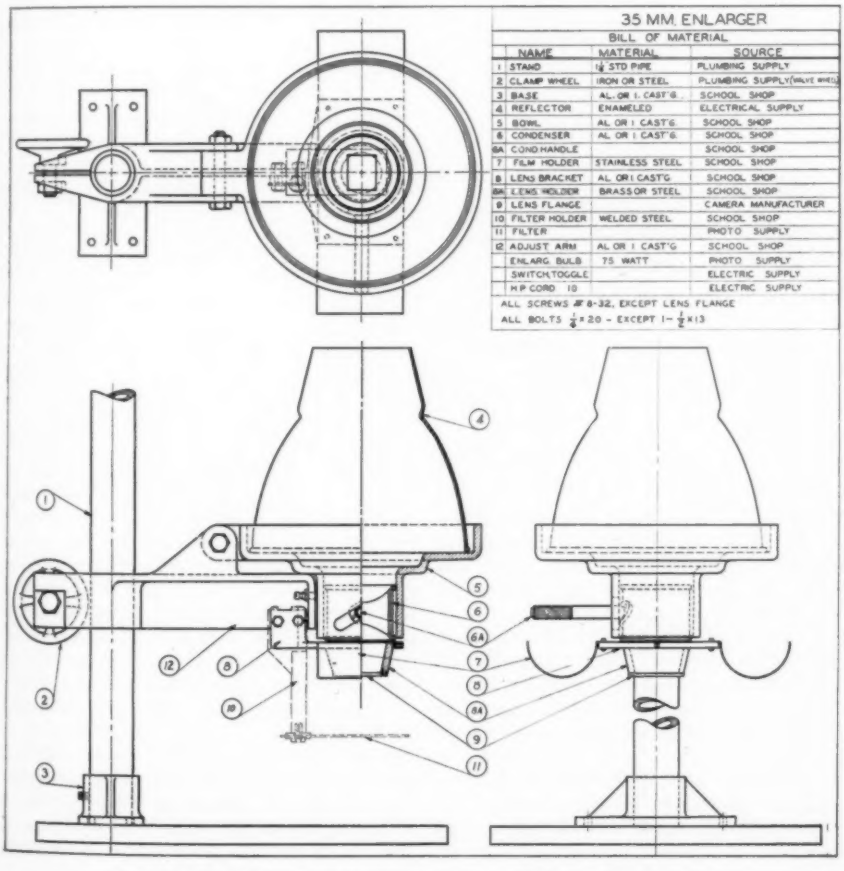
The shelf in the bowl above the condenser is for heat absorbing glass and filters if color work is contemplated. The reflector must be porcelain lined, as a polished metal reflector introduces too much specular light for the condensers. A piece of heavy amber plastic is used while arranging and focusing, and then swung out of the path of light.

With fine grain development of film, this enlarger has made ten diameter enlargements with no trace of grain or distortion. The cost, except for lens, was under $20.

(For illustration showing condenser, see page 250)



35mm. enlarger



35 MM. ENLARGER
BILL OF MATERIAL

	NAME	MATERIAL	SOURCE
1	STAND	¼ STD PIPE	PLUMBING SUPPLY
2	CLAMP WHEEL	IRON OR STEEL	PLUMBING SUPPLY(VALVE WHEEL)
3	BASE	AL. OR I. CAST'G.	SCHOOL SHOP
4	REFLECTOR	ENAMELED	ELECTRICAL SUPPLY
5	BOWL	AL OR I CAST'G.	SCHOOL SHOP
6	CONDENSER	AL OR I CAST'G.	SCHOOL SHOP
6A	COND HANDLE		SCHOOL SHOP
7	FILM HOLDER	STAINLESS STEEL	SCHOOL SHOP
8	LENS BRACKET	AL OR I CAST'G	SCHOOL SHOP
8A	LENS HOLDER	BRASS OR STEEL	SCHOOL SHOP
9	LENS FLANGE		CAMERA MANUFACTURER
10	FILTER HOLDER	WELDED STEEL	SCHOOL SHOP
11	FILTER		PHOTO SUPPLY
12	ADJUST ARM	AL OR I CAST'G	SCHOOL SHOP
	ENLARG. BULB	75 WATT	PHOTO SUPPLY
	SWITCH TOGGLE		ELECTRIC SUPPLY
	H P CORD 10		ELECTRIC SUPPLY

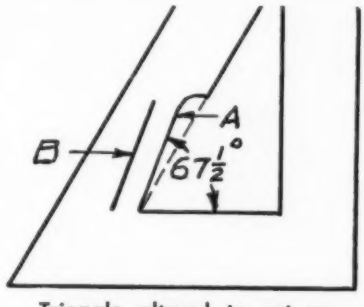
ALL SCREWS # 8-32, EXCEPT LENS FLANGE
ALL BOLTS ¼ × 20 - EXCEPT 1 - ½ × 13

Assembly of 35mm. enlarger. For condenser see page 250

TEMPLATE FOR DRAWING GUIDE LINES FOR LETTERING

HOWARD W. BOEKELOO
Industrial Education Department
Central High School
Kalamazoo, Mich.

Separate triangles giving the 67½-deg. slant for lettering mean just that much more equipment to be checked in and out from the drafting room tool crib. Some students make these of cardboard or other thin and easily



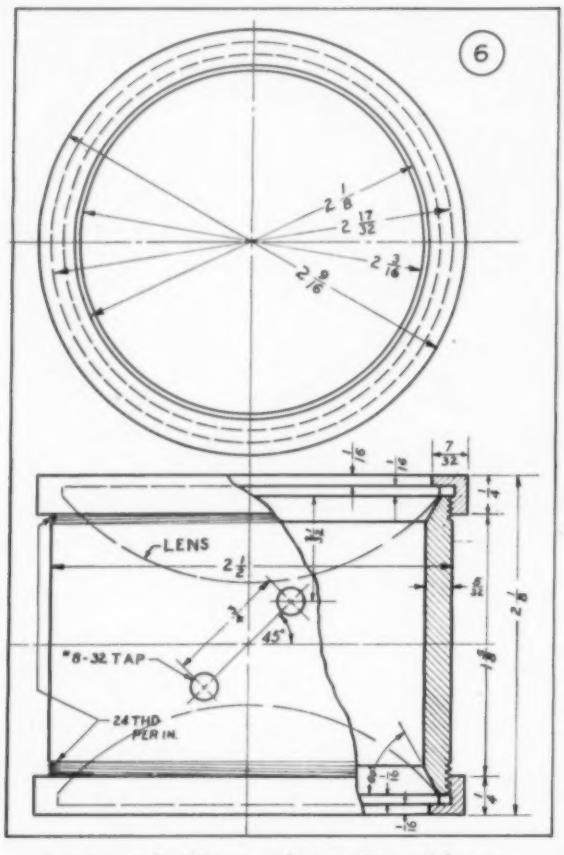
Triangle altered to act as template for drawing guide lines for lettering

cut material using the familiar 2 and 5 proportions but these are easily mislaid or lost. Make your regular 30–60-deg. triangle do this work by a slight alteration and each student is then equipped not only to draw the slant guide lines but to space them automatically as well.

Lay out the 67½-deg. cut shown at A, Figure 1, on the inside of each 30–60-deg. triangle with a master pattern and a scratch awl. Place a scratch (with the same slant) a short distance away from the first scratch. See *B*, Figure 1. This second scratch should be whatever distance you wish to have the slant lines drawn apart for your lettering jobs.

With a fine blade on the jig saw make the cut at *A*. Place the triangle in the vise and file the cut smooth with a small flat file. To use the new slant cut for automatically spacing lines, draw the first line and move the triangle to the right until the scratch falls over the line that has just been drawn. Draw the second line and repeat the operation for as many lines as you need.

By juggling your triangle about you can get a 22½-deg. angle useful for other purposes.



Condenser for 35mm. enlarger. For article see pages 248 and 249

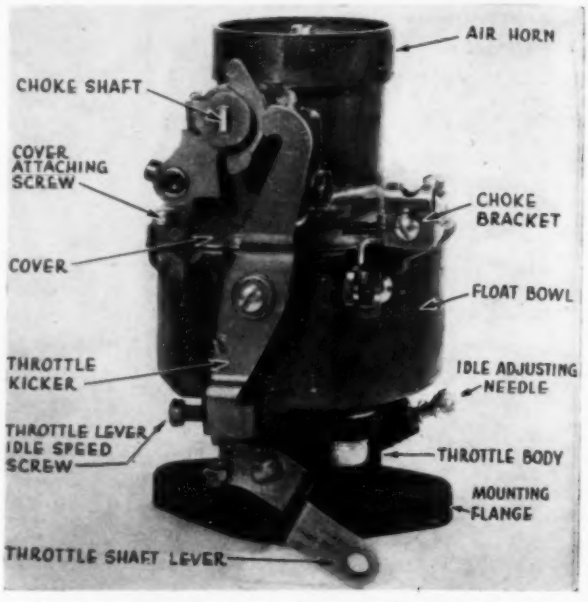


Fig. 1. Rochester-Chevrolet downdraft carburetor

THE NEW ROCHESTER G.M. CARBURETOR FOR THE 1950 CHEVROLET

RAY F. KUNS

Cincinnati, Ohio

The Model B carburetor shown in Figure 1 consists of three main castings, the air horn and cover, the float bowl, and the throttle body. By removing the four cover screws, it is possible to lift off the cover. At *A* in Figure 2, is shown the inverted cover and air horn held in the hand of the operator. The main parts of the carburetor, float bowl, and throttle body, remain fixed in place on the engine, and need not be removed for any ordinary adjustment or service.

Performance Design. Because a common passage is provided for both the idle and main fuel metering system, performance is smoother, since the fuel flow is continuous whether the engine is idling or delivering power. When warming up an engine it is often desirable to operate the engine with enriched or power mixtures without the need of advancing the accelerator to full wide-open position. In the Rochester carburetor, by the use of a vacuum operated power system, these heavier mixtures are readily available, because the power valve can function at any drop in manifold vacuum below 5 in. mercury regardless of the degree of the throttle opening.

When an engine is operated on hot days and then stopped the heat from the manifold and other engine parts rises and tends to cause boiling or percolation of the fuel within the carburetor. The Rochester carburetor has been designed to prevent hard starting and poor initial carburetion under such conditions. The carburetor has a ball type check valve built into the plunger head. As a consequence, any fuel boiling in the pump system by-passes the ball and allows the fuel to circulate back into the float bowl rather than into the engine. These features of performance design will be further discussed later on.

Service design. As already mentioned, the carburetor is designed to permit needed service and inspection by removing four cover screws (Fig. 1), after which the cover may be lifted off. The idle tube and pump jet are pressed into the cover passage at the factory and will require no replacement or servicing. No adjustments are required for part throttle or power mixtures.

Idle system. Fuel for idling the engine first passes from the bowl through the calibrated main metering jet *A*, Figure 3, in the bottom of the main well support assembly *B*. The fuel is then drawn up the main well by manifold vacuum to the crossbar of the air horn. Air joins the solid fuel through the three calibrated air bleeds *C* in the center of the crossbar. The fuel to air mixture ratio is then calibrated by the idle tube *D*, and the incoming charge passes down the passage in the float bowl, through the venturi to the throttle body. Below the throttle valve *F* will be noted the idle adjusting needle hole *E* with the adjusting screw. In operation, as the throttle valve is opened, the three idle holes *G* are exposed in turn to manifold vacuum, and deliver additional fuel to meet the increased engine demand.

Part Throttle System. As the butterfly valve *F* is opened to a greater degree, sufficient suction is applied to the main discharge nozzle *H* in the crossbar, to cause the fuel to pass from the main nozzle rather than through the idle system. The calibration of the main metering jet *A*, and the air bleeds *C* in the crossbar, control and maintain the economical fuel to air ratios throughout the 25– 60 m.p.h. driving range.

Power System. For high speed operation or increased loads, the power system is designed to deliver the fuel required readily and economically. To facilitate this, a direct manifold vacuum passage *M* within the carburetor to the engine intake manifold is incorporated. At any manifold vacuum above 5 in. of mercury, the power actuating piston *I* is held by suction in the *up* position against the compression of the power spring *K*. Consequently no fuel passes through the ball type power valve *J*. However with any decrease in vacuum below 5 in. of mercury the calibrated power spring *K* immediately forces the power piston down, thus unseating the spring loaded ball *L* in the power valve *J*. Fuel then passes readily around the ball into the base of the main well support assembly. The calibrated power restriction *N* meters the fuel prior to joining the fuel from the main metering jet, and is delivered to the engine. When vacuum rises above 5 in., the power piston returns to the *up* position and part throttle mixtures. No adjustments are necessary for part throttle or power systems.

Float System. As shown in Figure 3, the

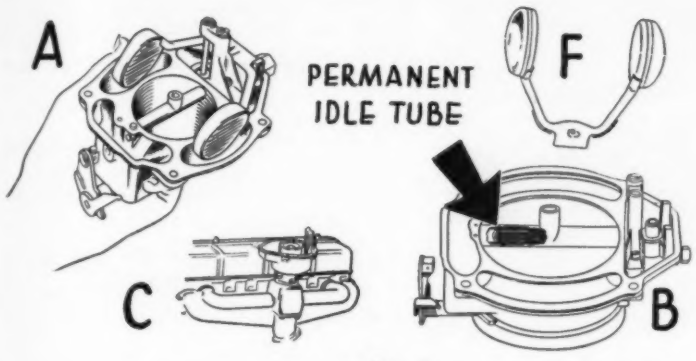


Fig. 2

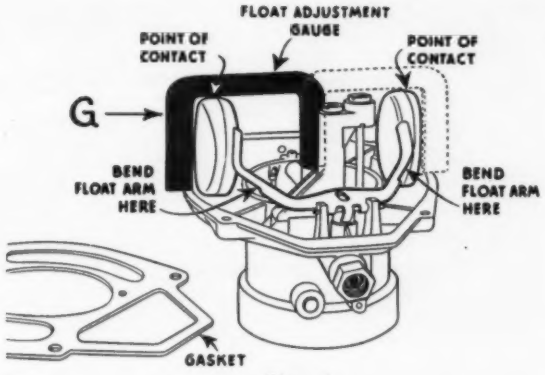


Fig. 4

Fig. 2. A, cover with float and jets; B, bowl; C, base and bowl left on engine; F, twin floats. Fig. 4. Getting float level using special gauge G

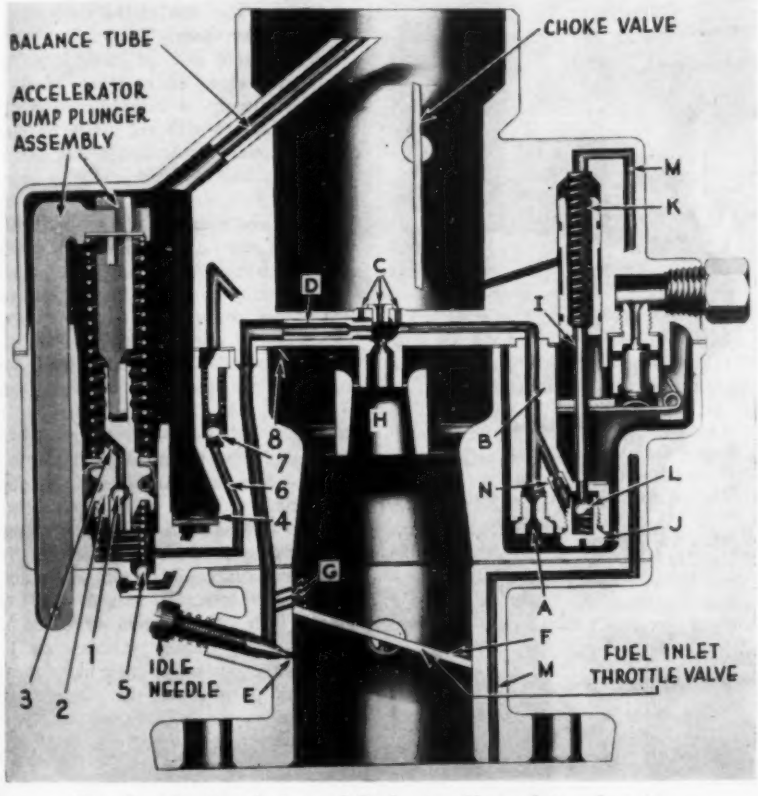


Fig. 3. Sectional view of Rochester-Chevrolet carburetor

air horn is connected to the carburetor bowl by means of an air tube. The purpose of this tube is to balance the pressure between the air horn and the carburetor bowl. This has the advantage of preventing any accumulation of dirt, which tends to clog the air cleaner, from causing erratic mixtures in the range of the carburetor. A distinctive feature of the Rochester carburetor is the design of the float bowl around the central air passage. This has the advantage of preventing any fuel from spilling from the nozzle on road inclines. Regardless of any angle the car may assume the fuel level is below the nozzle spill point. In order to insure the correct fuel level under all conditions, the carburetor employs twin floats. It is of utmost importance that the floats be adjusted carefully and accurately. Figure 4 shows the method of using the special gauge to secure the proper float level setting. The floats must be adjusted individually. Position the gauge *G*, Figure 4, with the step end inserted in the main discharge nozzle, and the other end resting on the edge of the top casting. Carefully bend the float arm so that the top of the one float just touches the horizontal side of the gauge. Reverse the position of the gauge and repeat the operation for the other float.

Pump System. The double spring pump plunger insures smooth, quick acceleration. The rates of compression of the top spring opposed by the bottom spring is calibrated to insure a smooth sustained charge of fuel for acceleration. All fuel for the pump system first passes through the pump screen 4, Figure 3, in the bottom of the float bowl. It is then drawn past the ball check 5 into the pump well on the intake stroke of the pump plunger. Upon acceleration the force of the pump plunger seats the ball check 5 and forces the fuel up the passage 6. The pressure of the fuel lifts the pump outlet ball check and spring 7 from its seat. The fuel is then sprayed on the bottom edge of the venturi by the pump jet 8 and delivered to the engine by the inrushing air.

PICTORIAL PENCIL DRAWING IN MECHANICAL DRAWING

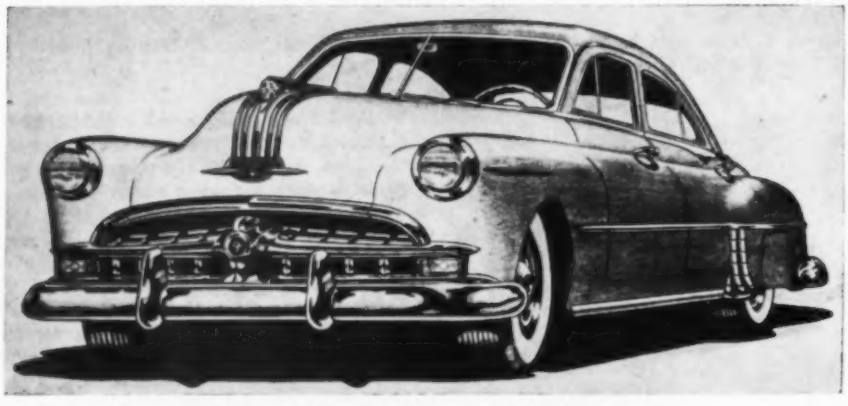
ERNEST V. RHODES

Montgomery Blair High School

Silver Spring, Md.

The cuts shown herewith are made from photographs of pencil drawings of automobiles produced in the freehand sketching done as a phase of mechanical drawing. When the lesson of freehand drawing of irregular geometric figures was presented, the writer had no idea that any member of his sophomore section would expand it to the extreme and include the use of drawing instruments. These drawings are two of a series of four drawings that Kevin Conroy made of cars. One of the four was a left side view of a model car of his own design. It may not be justifiable to allow him to continue this type of drawing as a part of the mechanical drawing course. However, this boy has decided that automobile body design is the type of work that he would like to pursue in the future, and he has made inquiries about college courses, and possibilities in this field.

Twenty-seven out-of-school clock hours were necessary for the drawing of the Buick model. The Buick and Pontiac are reduced drawings from large photographs or drawings that appeared in the daily newspapers. Kevin used dividers on some dimensions and reduced the scale, but no part was traced. The Pontiac was drawn about three-fourths the size of the



Drawings produced in the author's drafting room

original newspaper sketch. Kevin first made freehand sketches of the cars. He then modified the freehand sketches by use of straight edges and irregular curves. He used a No. 2 pencil for the shading work.

The writer feels that his duty as an instructor of industrial arts is to help his students to prepare to do best what they may do anyway. Together, Kevin and he have worked out a course in which the boy will make exploded view drawings of engines and accessories, and continue to develop his ability in pencil shading of the various parts.

BENCH WHIRLER

CHARLES H. SCHEINER

Montauk Junior High School

Brooklyn, N. Y.

The bench whirler, shown in Figure 1, is a fine tool to have in the shop. It can be used for finishing and decorating wood, metal, or clay objects. It is excellent for modeling and for revolving pieces when applying glaze with an air sprayer.

This useful tool was constructed in my shop from an old victrola disk, and a reel from the speaker of an old radio. Both parts were in the salvage department of our shop.

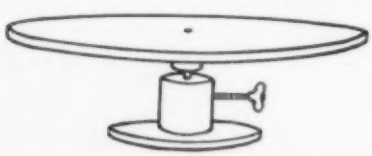


Fig. 1. Bench whirler

TOOLS AND MATERIALS

1. Empty radio reel
2. Phonograph disk
3. Machine screw 8-32, 1½ in. long
4. Wing nut to fit 8-32 machine screw
5. Small ball bearing
6. Hand drill and necessary twist drills
7. Tap for 8-32 thread and tap holder
8. Soldering equipment
9. Hack saw

Procedure:

1. Force fit a piece of round cold roll steel or any round piece of metal available, into opening of the disk.

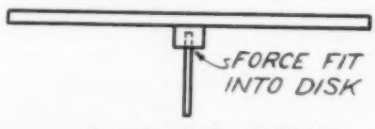


Fig. 2. Disk of whirler

2. Obtain the reel and remove one end.
3. Drill a hole into open end of reel, 1/64 in. larger in diameter than size of disk extension.

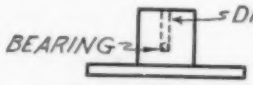


Fig. 3. Base of whirler

4. Drop a small bearing into reel.
5. Drill and tap 8-32 thread on side of reel.

Fig. 4

6. Sweat solder the wing nut to machine screw.
7. Put a drop of oil into hole and assemble.

THE CIRCULAR-INCH AS A UNIT OF MEASURE

J. T. SAWHILL

Colorado Springs, Colo.

Problems on the ellipse, the ovate, and the crescent are considered difficult. Our chief difficulty is that we use a unit of measure which is unsuited to the study of circular forms. We try to force the area of the circle into terms of the square inch. This method is never exactly accurate, since pi (3.14159265) cannot be stated in terms of the square inch.

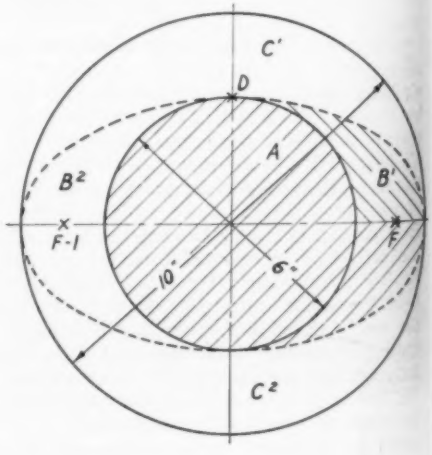
In our system of weights we use different tables suited to different types of merchandise: troy, for jewels, apothecary weight, for medicines, and avoirdupois for commercial products.

Our understanding of circles, and their various forms can be made much clearer by the use of a circular unit of measure. Such a unit gives absolutely accurate results, and the student is not confused by numbers carrying a long series of decimal fractions.

The *circular mil* is already in use among engineers, and craftsmen who work on very small areas. The circular mil is an area having only 1/1000 inch for its diameter.

By applying this same principle to larger areas, we have such areas as the circular inch, the circular foot, the circular yard, the circular mile, etc. Each of these units represents a circle having the diameter indicated.

For our study of the ellipse we are using the circular inch, its area is .7854 of the square inch. The system is based on the theorem that "Similar surfaces are to each other as the squares of their like dimensions." This unit of measure, the circular inch, fits exactly the areas of ellipse, ovate, crescent, and circle.



Draw an ellipse (see directions which follow), having a 6-in. minor axis, and 10-in. major axis. This ellipse has an area of 60 circular inches. See paragraph farther on for method of proving each problem.

In the center of the ellipse draw its inscribed circle, as shown in the cut; this circle 6 in. in diameter has an area of 36 circular inches. Observe that two crescent-shaped areas are formed, one at each end of the ellipse. To find the area of these crescents subtract the area of the inscribed circle from the area of the ellipse (60 — 36) or 24 circular inches (12 circular inches is the area of each crescent).

Now draw the exscribed circle, 10 in. in diameter; this circle forms two crescent shapes, one above and one below the ellipse.

To find the areas of these outer crescents subtract the area of the ellipse from the area of the exscribed circle (100 — 60) or 40 circular inches. The area of each outer crescent is 20 circular inches.

The shaded portion of the drawing shows an ovate (egg shape); the area of this ovate is found by adding the area of the inscribed circle (36) and the area of one of the end crescents (12). The ovate has an area of 48 circular-inches. The area could also have been found by multiplying its greatest length by its greatest width (8 × 6). Areas of ellipses and ovates are no more complicated than finding the areas of rectangles, when length and width are given.

Study the drawing, note that the ellipse occupies 6/10 of the area of the outer circle. Also that the small circle occupies 6/10 of the area of the ellipse. This is because the ellipse was drawn in the ratio of 6 to 10. In an ellipse 5 × 10 the ellipse would occupy ½ the area of the outer circle, or 50 circular inches.

How to Draw the Ellipse

There are several methods for drawing the ellipse. The string, or thread method gives fairly accurate results. The thread is tied to the pins placed at the two foci.

Always draw the ellipse in its relation to its inner, or inscribed circle, and its outer, or exscribed circle.

To locate the foci, set the compass for one-half the major axis (length), and with point D as a center, locate the two foci (F and F-1) as shown. Insert a pin at each foci, and at point D. Draw the thread tight around these three points, then remove the pin at point D, allowing the thread to run free as the pencil point carries the arc completely around the ellipse.

Rules

To prove the area of the circle, the ellipse, the ovate, and the crescent:

Circle: The diameter of a circle is squared, then multiplied by .7854 to find the area in square inches. To find the area of the circle in circlar inches square the diameter; thus a circle 8 in. in diameter has an area of (8 × 8) or 64 circular inches.

Ellipse: To find the area of an ellipse in circular inches multiply minor axis by major axis (length by width). Thus an ellipse 3 by 8 in. has an area of 24 circular inches.

NOTE: Circular units can be changed to square measure by multiplying by .7854.

Ovates (egg-shaped): Apply the same rule as for ellipses.

Crescents: For outer crescents, subtract the area of the ellipse from the area of the exscribed circle, then divide by two to find the area of each crescent.

For inner crescents, subtract the area of the inscribed circle from the area of the ellipse, then divide by two to find the area of each inner crescent.

Ovates: There are many forms of ovates. The form which we study is from the true ellipse. The inscribed circle of the ellipse plus one of the crescents, together form what we may call an elliptical ovate. An elongated ovate can be constructed by making use of two ellipses, each having the same minor axis, but a different major axis. Thus, draw an ellipse 4 by 10 in., and another ellipse 4 by 20 in., then use half of each ellipse cut on the minor axis, to construct the elongated ellipse. This ovate would have a length of 15 in., and a width of 4 in. The area would be 60 circular inches.

Ovoids: A solid body having the shape of an egg, is called an ovoid. A plane cutting through the "egg" parallel with its minor axis forms a circle. A plane cutting through the ovoid parallel with its major axis forms an ovate. The use of the circular inch greatly simplifies the study of these areas. An interesting study could be made of the eggs of the wild birds, no two species having eggs of the same shape. Some eggs are more pointed than others, and are not true elliptical ovates.

HOW TO PRODUCE MINUTE CHANGES IN THREAD PITCH

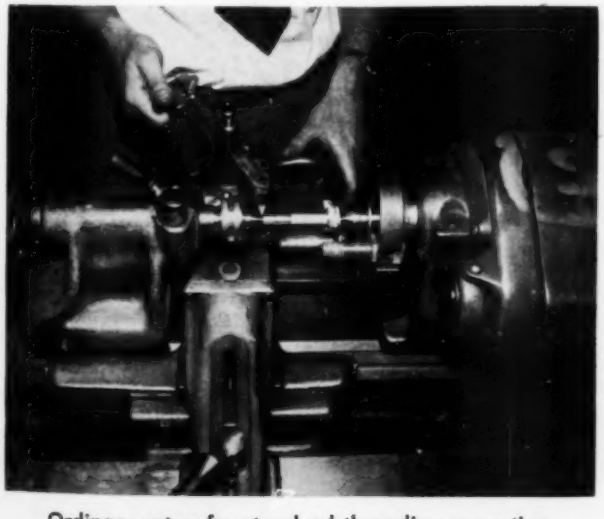
HOWARD N. KAY, Ens., U. S. N.
Public Information Officer
U. S. Naval Ordnance Laboratory
White Oak, Silver Spring, Md.

The adaptation of a formula for slight changes in pitches of threads was devised recently by personnel of the technical shop at the Naval Ordnance Laboratory, White Oak, Md. The pitch changes were intended for use in compensating for shrinkage in hardening of taps. The system was used advantageously in the manufacture of worm gears where it was necessary to increase the pitch from .062 to .065 in.

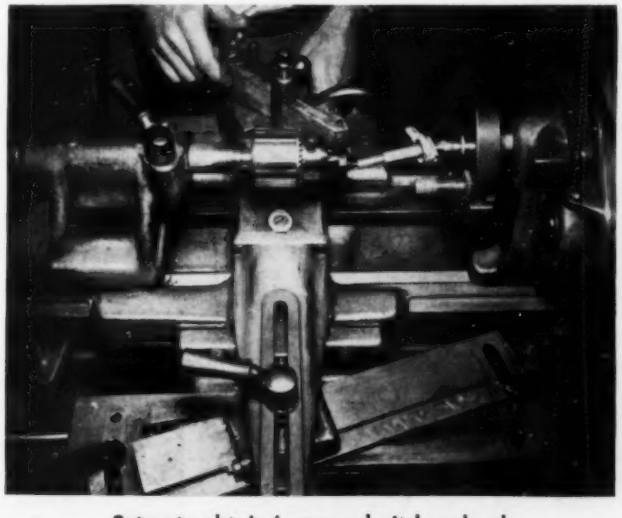
This slight variation was obtained by means of a taper attachment. The angle in this particular case was 20-deg. 12 ft. and the work was located at the same angle by adjusting the tailstock center.

The result was that the tool followed an angular path relative to the movement of the carriage and consequently the pitch of the thread increased slightly.

Microscopic readings were taken of the measurement and with a few minor adjustments the required results were obtained.



Ordinary setup for standard threading operation



Setup to obtain increased pitch or lead

A LIGHTWEIGHT AUTO-TOP CARRIER

J. HUGH CAPRON
Department of Industrial Arts
State Teachers College
Winona, Minn.

A lightweight auto-top carrier suitable for carrying boats, canoes, skis, and similar articles, can be made by the industrial-arts student at little expense. Figure 1 is an illustration of one of the units installed on the auto top. It will be noted that the carrier can be easily attached or removed from the car by simply tightening or loosening a single screw on each bracket.

Fig. 1. Carrier mounted on auto cabinet

The main portion of the carrier is made of thin wall, electrical conduit, approximately ¾ in. in outside diameter, which can be obtained from most electrical dealers or contractors. The 16-gauge black iron from which the brackets and hold-down clips are made will be available from a sheet-metal shop or can be salvaged from the steel in a discarded oil drum.

After obtaining necessary materials, measure accurately the distance between the drip moldings on the edge of the auto top at the locations for each of the two carriers. This measurement, minus twice the distance *A*, Figure 2, will be the exact distance between the vertical portions of the conduit after it has been bent to shape. No dimensions are given for *A* because this distance will vary with individual cars. The actual bending of the conduit may be done in a number of different ways. Perhaps the best tool for the job is an electrician's conduit bender. However, the bends pictured were formed, with excellent results, on a Hossfeld Iron Bender.

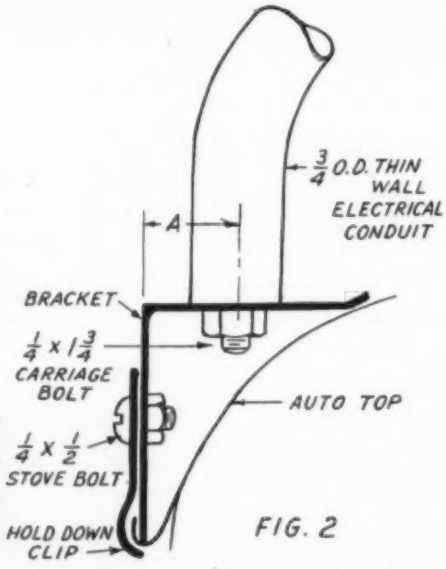


FIG. 2

The special device for attaching the conduit to the brackets can be made in a number of different ways. Two of these are shown in Figure 3. The particular unit shown was made with the steel plug which was attached to the conduit with a pin. The plug was attached to the bracket by peening the tenon-like end after it had been forced through a properly located hole in the horizontal face of the bracket. The alternative method for attaching the conduit and the bracket are self-explanatory in Figure 3.

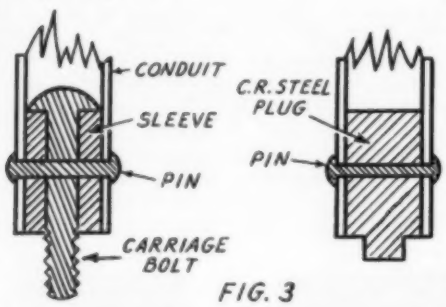


FIG. 3

The several views of the 16-gauge black iron brackets give sufficient details for their layout. It should be noted that dimensions are approximate and must be varied to suit the individual car. A hack saw or slitting shear can be used to cut these pieces to shape and the bending should be done in a metal-working vise.

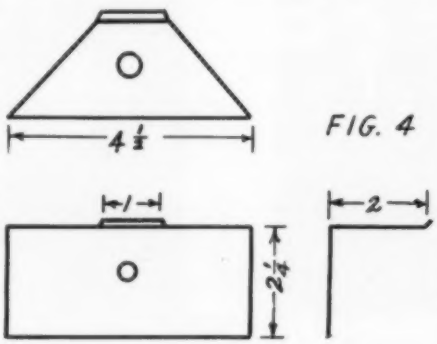


FIG. 4

Parts of auto-top carrier

The hold-down clips are next and they too can be cut to size with a hack saw or slitting shear, shaped in a vise and the edges smoothed with a file. Prior to drilling the brackets and clips, all pieces should be fitted together and marked on the auto top. This will eliminate the possibility of error in the location of drilled holes.

When all parts have been assembled and fitted, complete the job by finishing the carriers in the same color as the car on which they are to be used.

Statistics show that on a long range scale the skilled labor supply of this nation is not being replenished at a rate fast enough to meet the demands of industry. A survey has shown that there are at present over 400,000 establishments in the United States which have facilities for employing and training apprentices. Of these establishments only 150,000 have registered programs today. If we are to maintain our much needed labor force at its present level and expand it for the development of present and future industries there must be a registered apprentice program operating in each of the 400,000 establishments having such facilities.

— *William F. Patterson*

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ASSOCIATION NEWS

(Continued from page 6A)

Association is a national organization whose convention is intended to give further service to industrial-arts teachers, supervisors, and teacher trainers. Nearly every state has its supplementary organizations which hold state conventions. All these organizations serve some need or they would cease to exist. They take time, effort, and money.

Antedating the above organizations and still going strong is the Mississippi Valley Manual Arts Conference — now the Industrial Arts Conference — which will hold its 37th annual meeting in October. This organization of teacher trainers, with a limited membership of leaders in the field, is well known. Its pattern of brief presentations followed by general discussions is always stimulating and helpful to those present. It has made contributions to the advancement of all phases of industrial education. National conventions have not outmoded and will not outmode this older conference for they cannot provide the time and opportunity for a group of specialists to sit down and work out their own problems together.

The specialists' conference brings together people with common problems where they may consider and apply values gained from conventions, readings, personal contacts, and, above all, *experience*. The conference attempts to find answers to problems of application. *What can be done about it?*

The teacher trainers have a head start over other industrial-education workers because of their conference. Supervisors, aware of this, met experimentally, August 11–13, 1949, in Peoria as guests of Bennett College, Bradley University, to test the value of such an organization for themselves. Persons attending the meeting were: D. Arthur Bricker, supervisor of industrial arts, Cincinnati; Amos D. Coleman, state supervisor of industrial arts, Springfield; A. L. Cunningham, vocational co-ordinator, Gary Public Schools; Fred E. Dace, associate dean, Bennett College, Bradley University; Floyd M. Dickey, industrial-arts teacher, John Adams School, South Bend, Ind.; L. P. Elliott, supervisor of industrial arts, Peoria; L. J. Fletcher, director of training and community relations, Caterpillar Tractor Company, Peoria; J. H. Hawkins, supervisor of industrial arts and vocational education, Danville, Ill.; Wayne P. Hughes, National Safety Council, Chicago; James Ingram, instructor of machine shop and apprentices, South Bend; George E. Kohrman, state director of industrial education, Missouri; Euclid Lamber, co-ordinator, industrial arts, Kankakee, Ill.; John J. Matthews, director of vocational education, Gary; John J. Metz, editor of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, The Bruce Publishing Co., Milwaukee; Alvin H. Miller, supervisor of industrial arts, Lincoln Public Schools, Lincoln, Neb.; Lawrence W. Prakken, editor, *School Shop*, Ann Arbor, Mich.; Roy A. Radtke, supervisor of industrial arts, Milwaukee; Arthur L. Reagh, director of industrial arts and vocational education, Grand Rapids City Schools; Charles A. Roper, publication and sales manager, McKnight and McKnight Publishing Co., Bloomington, Ill.; John F. Robohm, consultant, industrial education, Minneapolis; M. J. Ruley, director, industrial arts and vocational education, Tulsa, Okla.; Harlan J. Shufelt, supervisor of industrial arts, Racine, Wis.; also secretary-treasurer, Wisconsin Industrial Arts Association; Earnest J. Simon, director of vocational education, State of Illinois; L. Laurens Simpson, president, The Manual Arts Press, Peoria; R. H. Simpson, vice-president, The Manual Arts Press, Peoria; Burton C. Smith, supervisor of industrial arts, La Crosse, Wis.; Fred Strickler, dean of Bennett College, Bradley University, Peoria; Paul Van Winkle, editor, Manual Arts Press, Peoria; Paul R. Waugh, director, vocational education, Peoria; Phil S. Waldeck, state supervisor of industrial arts, Columbus, Ohio.

Editor Metz outlined the methods and values

ASSOCIATION NEWS

(Continued from previous page)

of the Industrial Arts Conference as a suggestive guide for the supervisory conference. L. J. Fletcher, director of training for Caterpillar Tractor Company, similarly outlined the methods and values of industry's conference for directors of training. Chairman Simon, following these leads, proceeded skillfully in guiding the conference so that discussions of presentations by Dickey, Bricker, Radtke, and others were kept to point with all persons participating. The first two days of the conference supplemented by evening plant visitations and "bull sessions" were considered so worth while that the final session was given over to an appraisal of value and the formation of a permanent organization which will be known as *The Industrial Educator's Supervisory Conference.*

The proceedings of the conference were recorded and copies are available for a limited number of persons in key positions in industrial education supervision and teacher training. It is anticipated at this writing that all copies of the proceedings will have been distributed before the publication of this issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Persons receiving copies may use them in any way they think professionally desirable. The material is not copyrighted and may be duplicated in part or in full for further distribution and use.

The proceedings of the conference should prove helpful to teacher trainers by bringing into focus some of the problems faced by supervisors in orienting and guiding their graduates into the realities of actual teaching practice. The greatest progress in both industrial supervision and teacher training can come only through a reciprocal give and take. Neither area can do the work of the other and neither one can get far by ignoring the problems and the accomplishments of the other. A few supervisory conferences should provide teacher trainers with valuable working data. The teacher trainers would be wise in turn, to provide supervisors with similar materials. The general national convention may well prove to be an effective co-ordinating agency which will point up the contributions of both groups and round out the picture.

TEXAS VOCATIONAL ASSOCIATION CONVENTION

The ninth annual meeting of the Texas Vocational Association was held May 5 and 6 at Galveston, Tex. All vocational educational services in the state participated in the series of meetings conducted in this coastal city. Sectional meetings included those of agriculture, business and distributive education, guidance and rehabilitation, homemaking, industrial arts, trade and industrial, and veterans education.

Mrs. Lucille Martin, homemaking supervisor, San Antonio, Tex., was elected president of the Texas Vocational Association for the 1950–51 school year.

While meetings began on Friday, high lights of the convention activity took place Saturday, May 6. All groups held sectional meetings in the morning and the second general meeting was held in the afternoon. Dr. J. W. Edgar, newly appointed commissioner of education, spoke on "The Texas Education Agency — Its Program and Its Scope." Thomas R. Wells, superintendent of schools, Pascagoula, Miss., was principal speaker at the first general session Friday, May 5.

Business sessions were presided over by James R. D. Eddy, director of industrial and business training, The University of Texas, Austin. As deck officer of the Ship, Harry W. Sears of the American Technical Society, Chicago, Ill., distributed prizes from the Ship's loot. Sears was assisted by Charles Roper, Eugene Fink, and others.

More than 700 persons registered for the Galveston meeting. Announcement was made during the course of the two-day gathering that membership in the Texas Vocational Association had passed all previous records with more that 2500 persons having paid-up membership in the organization. H. H. Huffaker, co-ordinator of vocational education in Galveston, was chairman of local committees who made arrangements for the 1950 meeting. — *Earl M. Bowler*

♦ Alpha Iota Chapter of Epsilon Pi Tau at Louisiana State University, Baton Rouge, held its first anniversary initiation and banquet on April 15, 1950.

Dr. Dewitt Hunt, head, School of Industrial Arts Education and Engineering Shopwork, Oklahoma A. & M. College, spoke on "The Professionalization of Industrial Arts Teaching" at the banquet. Also present at the banquet were S. M. Jackson, state superintendent of education, and H. O. Thomas, state supervisor of industrial arts, who was toastmaster for the occasion.

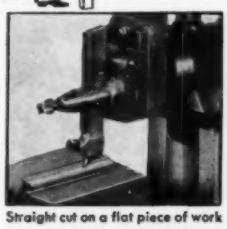
Invocation was given by P. V. Rougon, instructor, department of industrial education, Louisiana State University, and Dr. N. A. Hauer, head, department of industrial education, Louisiana State University, welcomed the guests. The new members are: undergraduate students, Norman T. Bonifay, Alvin B. Burchfield, James Couvillion, James O. Godbold, John H. Kilpatrick, James B. Watts, Ralph P. Whitehead, Keith Williams, and Sidney L. Williams; graduate students, Valex Richard, William R. McDanel and Jerome Bowling, Jr., director of Baton Rouge Trade School; faculty members, Alvin R. Doyle and James B. Warren, and one alumnus, E. M. Breaux, instructor at Southwest Louisiana Trade School, Crowley, La.

The student officers are Russell Williams, president; Edward Daigle, vice-president; Rudolph Pharis, secretary; and Adolph Dubourg, treasurer. Ralph E. Stucki, instructor, department of industrial education, is the faculty trustee for the chapter at Louisiana State University. — *Ralph E. Stucki.*

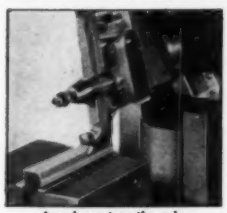
(Continued on page 18A)

PERFECT FOR SCHOOL SHOPS...

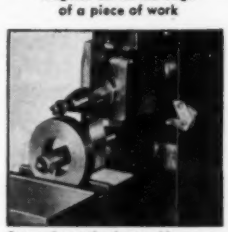
THE AMMCO 7" SHAPER



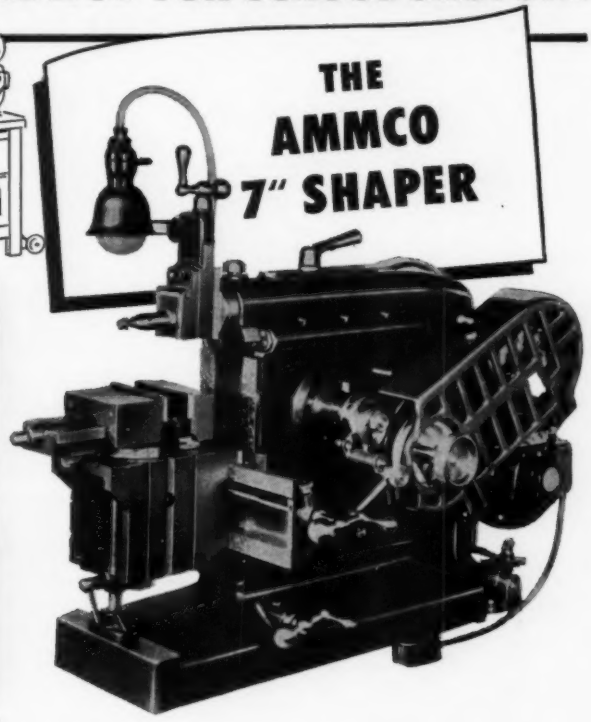
Straight cut on a flat piece of work



Angular cut on the edge of a piece of work



Set-up for cutting internal key ways



MAXIMUM STROKE, 7¾". Strokes per minute 40, 70, 115, 180.
TOOL HEAD adjustable and graduated from 0° to 90° for angle work.
FEED MECHANISM of reversible, adjustable type. Feed varying from .003" to .018" obtainable.
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These typical quality features insure long life, continued accuracy, and low maintenance costs!

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Never need oiling—they're lubricated for life before they leave the factory. Double-sealing keeps dirt out, lubricant in.

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Perfectly round, true to size, correctly positioned, properly aligned. Bearings fit closely, are tightly held, cannot become loose.

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An extra manufacturing operation removes "end play." This provides maximum rigidity and accuracy under load and increases bearing life.

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All spindles, arbors, and collars are ground for accuracy, to provide full, even contact between shaft and bearing — and assure accuracy.

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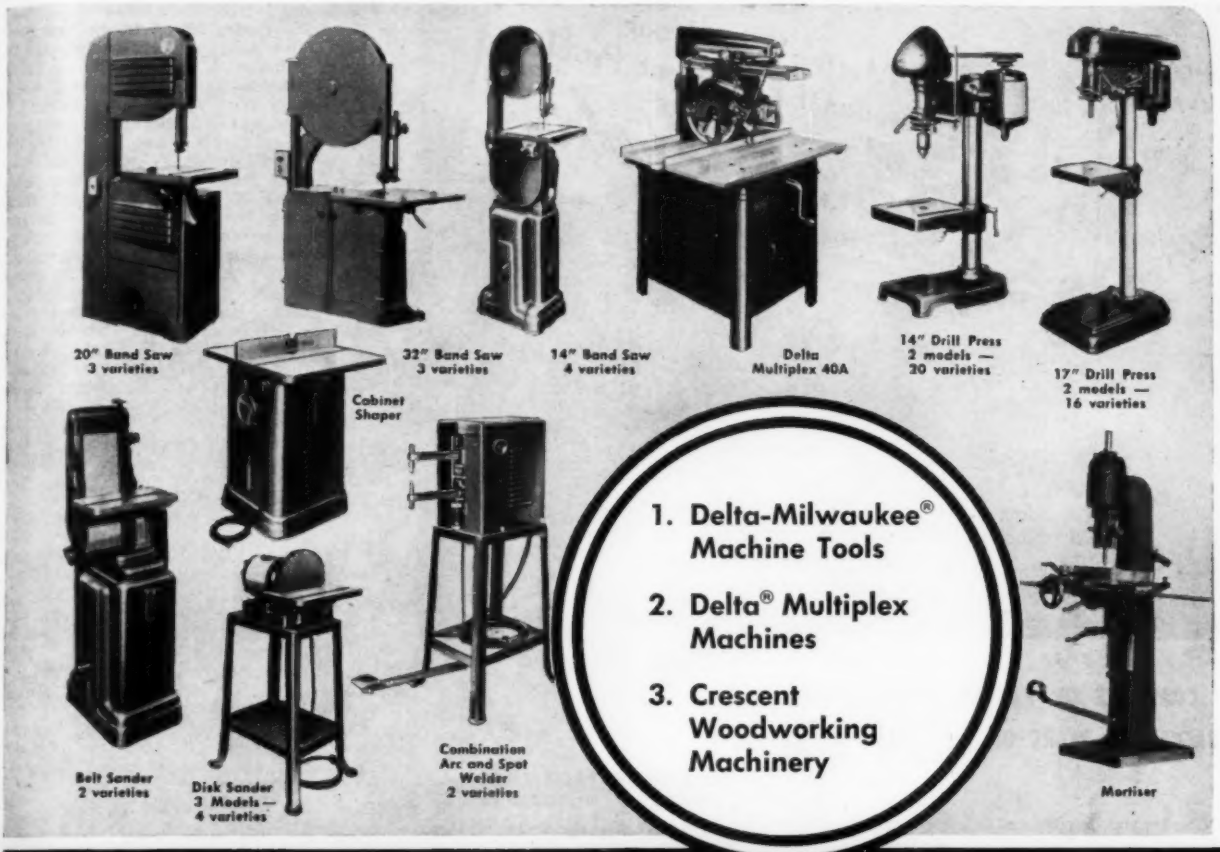
Pulleys which transmit the power from motor to machine are dynamically balanced to help eliminate damaging vibration.



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Send the coupon below for facts on every tool in the entire Delta line—and for free copy of "How to Plan a School Workshop."

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ASSOCIATION NEWS

(Continued from page 15A)

♦ The Kentucky Industrial Arts Association held its meeting in Louisville, Ky., at the annual session of the Kentucky Industrial Education association. The following program was presented:

L. T. Smith, head, industrial arts department, Western Kentucky State College, Bowling Green, Ky., was chairman of a panel discussion concerned with "Industrial Arts in Kentucky." Van R. Catlett, instructor, industrial arts, Barrett Junior High School, Louisville, Ky., discussed "Industrial Arts in the Junior High School." R. E. Carter, instructor, industrial arts, Dixie Heights High School, Kenton County, Covington, Ky., discussed the topic: "Industrial Arts Meeting the Needs of the High School Student." S. F. Tharpe, instructor, industrial arts, Dupont Manual High School, Louisville, Ky., discussed "Industrial Arts in the High School." Ralph W. Whalin, head, industrial arts department, Eastern Kentucky State College, Richmond, Ky., discussed the topic: "Teacher Training in Kentucky."

The following officers were elected for the coming year: *president:* James Homer Davis, assistant professor, industrial arts, Eastern Kentucky State College, Richmond, Ky.; *vice-president:* R. E. Carter, instructor, industrial arts, Dixie Heights High School, Kenton County, Covington, Ky.; *secretary-treasurer:* Grover Salyers, instructor, industrial arts, Jefferson County Public Schools, Louisville, Ky.; *members-at-large:* W. H. Slack (retiring president), instructor, industrial arts, Dupont Manual High School, Louisville, Ky.; John R. Owens, instructor, industrial arts, Greenville High School, Greenville, Ky.

♦ Following is a list of the names and addresses of the newly elected officers in the New Jersey Section of the American Vocational Association: president: Charles A. Hass, Middlesex County Vocational Schools, 618 New Brunswick Avenue, Essex County Voc. Tech. High School, 209 Franklin Street, Bloomfield, N. J.; treasurer: Robert J. Kessler, 328 Becker Street, Highland Park, N. J.; vice-presidents: agricultural: Owen E. Kiser, New Jersey State Agricultural College, New Brunswick, N. J.; trade & industry: Richard Lane, General Voc. Tech. High School, Paterson, N. J.; home economics: Miss Hilda E. Chilson, High School, Passaic, N. J.; industrial arts: Lentz D. Gold, Atlantic City Public Schools, Atlantic City, N. J.; distributive education: Joseph E. Bowen, Bridgeton High School, Bridgeton, N. J.; life memberships: Samuel Martin, Summer Street, Elizabeth, N. J.; adviser: John A. McCarthy, Assistant Commissioner, Vocational Division, Department of Education, Trenton, N. J.

♦ Dr. Verne C. Fryklund, president of Stout Institute, Menomonie, Wis., addressed the Industrial Arts Club of Eastern Kentucky State College on March 28, 1950, at a dinner meeting in the Student Union Building on the campus.

Guests were invited from the University of Kentucky, Berea College, Lafayette Vocational School, Somerset Vocational School, and neighboring high school industrial-arts departments.

♦ The Long Island Industrial Arts and Vocational Teachers Association sponsored the second annual Industrial Education Exposition on May 12, 13, and 14, 1950, at Hofstra College, Hempstead, Long Island, N. Y.

The theme of the exposition was "America at Work and in the Schools."

Last year's show was so successful on one night that it was expanded to three days and nights this year. The program was greatly enlarged. At the exposition there was a display of industrial-arts projects from all of the schools of Nassau and Suffolk counties along with a much expanded exhibit section by the leading industries of Long Island and many commercial exhibitors.

The projects were displayed and judged according to grade level and subject areas.

♦ The Institute for Teachers of Mathematics, sponsored by the Association of Teachers of Mathematics in New England, will be held August 22 to 29, 1950, at Tufts College, Medford, Mass.

The program will include speakers on the latest developments in pure mathematics, and others on applications of mathematics by leading mathematicians from college faculties, business, research, government agencies, and industry. There will also be discussion groups on methods of teaching.

For further information write to Albert Norris, Milton Academy, Milton, Mass.

♦ The South Eastern Industrial Arts Conference was held at the Washington Park High School, Racine, Wis., on April 29, 1950.

The chairman, T. E. Beach, head of the industrial-arts department of the high school, called the meeting to order.

J. E. TePoorten, co-ordinator, Wisconsin Schools of Vocational and Adult Education, Madison, Wis., spoke on "Industrial Arts and the Apprenticeship Program."

He dwelt upon the need of an industrial type of education in our industrial democracy. Education must prepare the student to earn a living, because if he lacks that knowledge he cannot live.

The industrial-arts teacher has an opportunity to pick the boys who are to enter apprenticeship, and to help them develop the right interests and attitudes.

Roy A. Radtke, supervisor of industrial arts in the school system at Milwaukee, Wis., spoke on the subject of "Industrial Arts in the New Curriculum." He pointed out the necessity which confronts every shop teacher, namely, to help the teachers of the academic subjects to correlate their subjects with shopwork so that the student

(Continued on page 21A)

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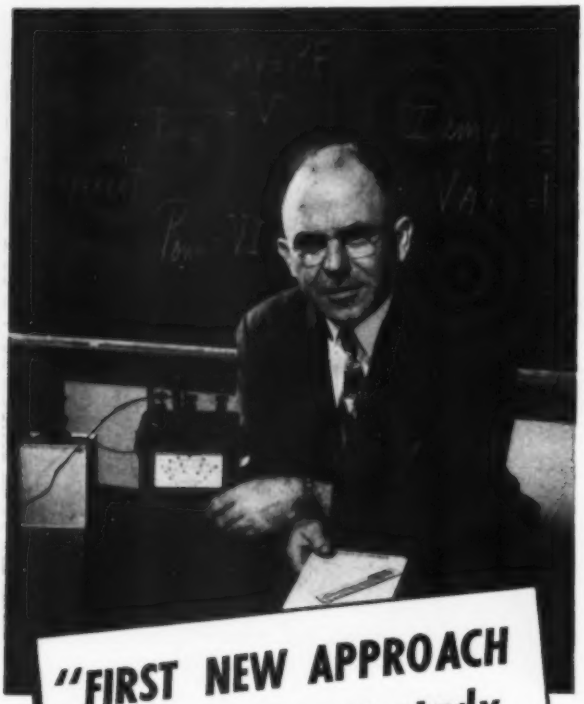

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—says Professor Harold W. Bibber, head of Union College's Electrical Engineering Department

G-E's AF-2 Load Visualizer provides an easier way to introduce students to current-vector analysis. You needn't interrupt your explanation of principles to make lengthy computations. The instrument and calculator get the answers quickly and simply.

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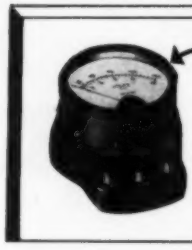

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ASSOCIATION NEWS

(Continued from page 18A)

has an opportunity to acquire a background of related material which will help him to become a useful member of our industrial society.

H. J. Shufelt, supervisor of industrial arts in the school system of Racine, Wis., then announced that the meeting next year would be held at the Norris Farm for delinquent boys. The date of the meeting is to be settled later.

A luncheon followed, after which the shops of the school were visited.

♦ The Industrial Education Club, Iowa State College, Ames, Iowa, elected new officers on March 2, 1950: president, Keith Meek; vice-president, Ronald Emery; secretary, Maurice Alsin; treasurer, Kenneth Mann; publicity, Gene Moore.

♦ The Kentucky Industrial Arts Teacher Trainers held their fifth semiannual meeting during the meeting of the Kentucky Education Association on Thursday, April 13. The men in attendance were as follows: L. T. Smith (chairman), W. B. Nalback and H. B. Clark, of Western State College, Bowling Green, Ky.; Ralph W. Whalin, Homer Davis, N. G. Denniston, and D. C. Barnes of Eastern State College, Richmond, Ky.; H. L. Oakley, and Marion Brown, Murray State College, Murray, Ky. The fall meeting will be held at Murray State College.

♦ The officers of the Tulsa Manual Arts Club for the second semester are Harry McGinnis, president; Earl McMahon, vice-president; and E. L. Southard, secretary-treasurer.

♦ The University of Oklahoma, Norman, Okla., will hold an industrial-arts clinic May 29–June 2, 1950.

Guest lecturer will be Gerald Baysinger, department of industrial education, Wayne University, Detroit, Mich. Dr. Robert A. Hardin will be the faculty chairman of the clinic.

Personal News

FRED C. FINSTERBACH HAS NEW ASSIGNMENT

Fred C. Finsterbach has been appointed director of education of the Walker-Turner Division of Kearney & Trecker Corp., Plainfield, N. J. He will have charge of the sales training, the development of instruction booklets and sales aids of interest to both industries and schools.

Fred C. Finsterbach

Mr. Finsterbach comes from New York State Teachers College at Buffalo, where he was assistant professor of industrial arts. He has also served as senior education supervisor for the New York State Education Department at Albany. During the war Mr. Finsterbach assisted in the development of the state training schools for airplane mechanics.

He is a graduate of the State Teachers College at Buffalo, N. Y., where he received a B.S. degree in industrial education. He has also studied at Wayne University, receiving the master's degree in education. Mr. Finsterbach has completed residence requirements for the doctorate degree at the University of Buffalo.

His industrial experience has included work with the Spencer-Lens Division of the American Optical Co., The Empire Engineering Co. of Detroit, the Chevrolet Motor Co. of Buffalo, and the Worman Advertising Co. of Buffalo.

He is a member of the American Vocational Association, The American Industrial Arts Association, the Phi Delta Kappa, Delta Kappa, and Epsilon Pi Tau Fraternities.

♦ Dr. Leonard C. Mead, research co-ordinator, Tufts College, Medford, Mass., has been named chairman of the Joint Panel on Training and Training Devices of the Research and Development Board, Department of Defense.

This panel will concern itself with research and development on new and improved equipment and procedures in training and education, including the learning process, curriculums, teaching and trainers, mechanized evaluators and simulated methods of training in the use of operational equipment; special devices, including synthetic trainers, mechanized evaluators and simulated operational systems; and training aids, including films, slides, and associated equipment, graphic aids, and tridimensional aids such as mock-ups and models.

The Panel will undertake to have appropriate training programs and training aids available to the military services as new equipment is ready for use so that optimum and immediate use may be made of the equipment.

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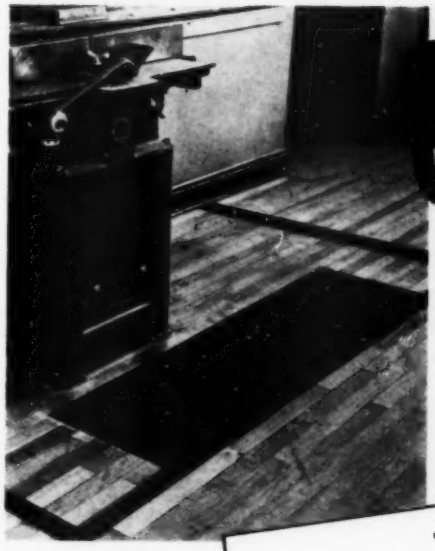

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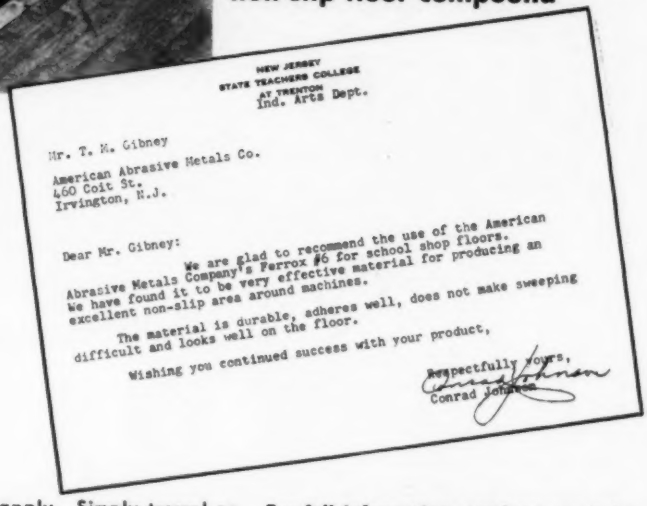
READ HOW ferrox* HELPED PROVIDE SURE FOOTING AROUND MACHINES!

... when this industrial arts department applied FERROX non-slip floor compound



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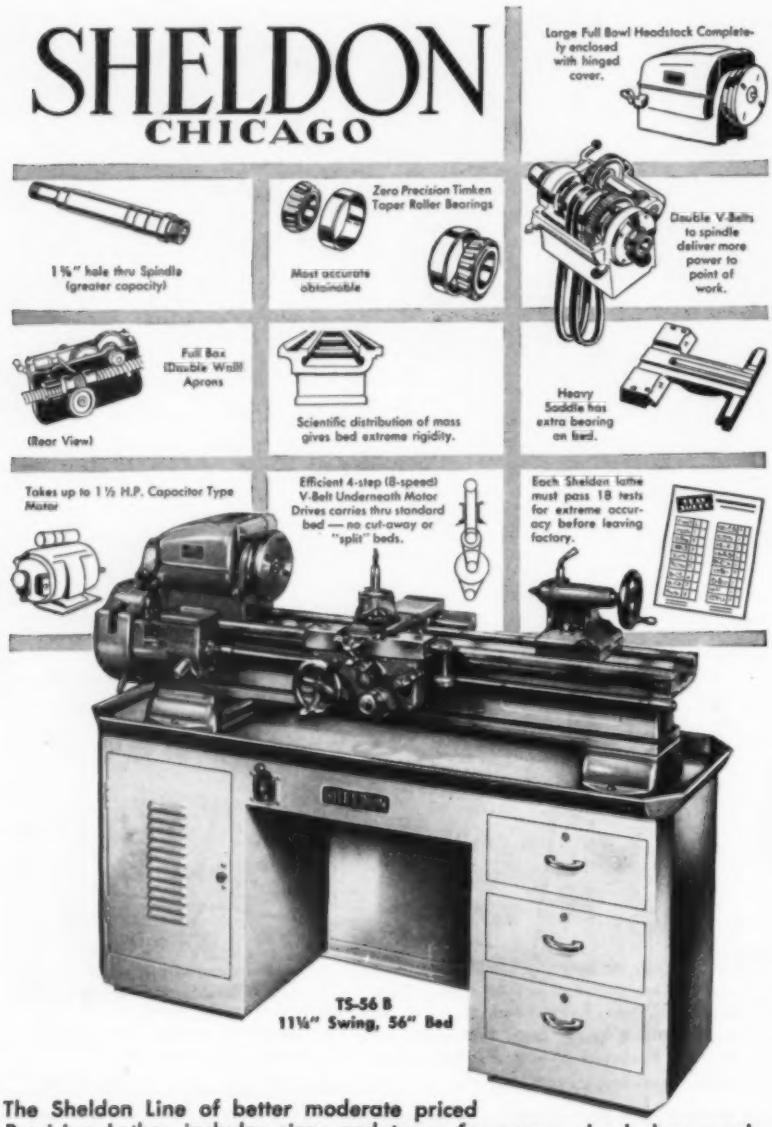
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Scientific distribution of mass gives bed extreme rigidity.
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PERSONAL NEWS

(Continued from previous page)

♦ DR. ROBERT E. SMITH of Ohio State University will be honored at a banquet on May 20, in Columbus, Ohio. Dr. Smith is retiring from active duty as a professor of industrial arts and vocational education at the end of the spring quarter.

Members of the committee making plans for this event are M. J. Learner, Ashland; Clarence Bateman, Columbus; Art Miller, Newark; K. J. Herbert, Barberton; Frank Moore, Cleveland; A. M. Chavous, Wilberforce; and Phil Waldeck, Columbus.

♦ The following students of the industrial education department, Iowa State College, Ames, Iowa, were graduated at the end of the fall quarter with a B.S. degree in industrial education: AGNER ANDERSON, FREEMAN BALES, HORACE BARTON, STANLEY BENTALL, MARVIN CASEY, RICHARD DYAS, RICHARD FREY, BURR MCFARLAND, FRANK MCCOY, LANE MCPHEE, ROBERT MAHON, WENDELL PERKINS, HARRY SOMMERS, CHRIS STEINBACH, ROGER STEWART, ALAN TRACY, WILLIAM WELCH, JOHN WINSLOW, and GLENN WRIGHT.

♦ ROBERT J. HULL has been appointed supervisor of school building service in the Wisconsin State Department of Public Instruction, Madison, Wis. He succeeds H. W. Schmidt, who retired in the fall of 1949.

♦ EDWIN M. HARRIS, president of the Connecticut Industrial Arts Association, and instructor in Bassett Junior High School, was recently appointed supervisor of industrial arts for the New Haven school system, New Haven, Conn.

Mr. Harris was appointed instructor in the New Haven schools in 1931 and has taught woodwork, metalwork, printing, and mechanical drawing in various schools throughout the city. He was graduated from Fitchburg, Mass., State Normal School in 1931; returning during the summers after the school was made a Teachers College. He received his B.S.Ed. in 1937. Currently he is completing graduate work at New York University under the Charles B. Hendricks Memorial Scholarship.

The post of supervisor of industrial arts is a new one created as a result of recommendations in the Butterworth School Survey.

♦ MINOR HAWK is assistant professor of engineering drawing at Washington and Jefferson College at Washington, Pa. Before going to Washington and Jefferson, he taught at Belle Vernon High School, Charleroi High School, and Pennsylvania Area College Center at Charleroi, Pa.

♦ DAVID JACKSON is an inspector of the door shop at the American Car and Foundry Company in Berwick, Pa. He intends to install a new industrial-arts shop at Nescopek, and teach full time in the fall.

♦ LIEUTENANT GENERAL LESLIE R. GROVES, U.S.A. Ret., was the principal speaker May 5 at the Illinois Institute of Technology annual Alumni Reunion dinner.

General Groves directed the development and production of the first atomic bombs as head of the Manhattan Engineer district. He is now vice-president of Remington-Rand, Inc., in charge of scientific research.

♦ JOSEPH F. SORACE, formerly instructor in machine composition, department of publishing and printing, Rochester Institute of Technology, has been given the job of organizing an Intertype School of Instruction, at the Intertype plant in Brooklyn.

♦ The five top awards in the 1949–50 Essay Contest, sponsored by International Printing Ink and the National Graphic Arts Education Association, went to girls. In all, the girls took 22 out of the possible 30 awards for the written essays.

News Notes

♦ The new Practical Arts Building, at Ball State Teachers College, Muncie, Ind., was dedicated on April 21, 1950, at 7:45 p.m.

♦ Special programs in guidance and counseling and related areas of psychology will be offered during the summer quarter, June 21–August 23, at the University of Denver.

A special condensed workshop in guidance and counseling will also be offered at Denver University from July 24 through 28.

Persons interested in enrolling for one of these programs are urged to contact the director of the summer quarter, University of Denver, Denver 10, Colo.

♦ Techniques of promoting industrial understanding through education were explained by Cornell University's School of Industrial and Labor Relations when the AFL Union Industries Show opened in Conventional Hall and Commercial Museum in Philadelphia.

The university exhibit was among the hundreds visited by the more than 500,000 persons who came to attend the big show, from May 6 to 13.

Professor Dave Hyatt was in charge of the Cornell exhibit which provided continuous projection of color slides illustrating the schools threefold program of undergraduate and graduate instruction, research and information, and adult education.

The show was devoted primarily to celebrating U. S. leadership in quality and quantity of production of union-made products. President Truman has called the exhibition "an object lesson in democracy."

♦ A new series of ten silent film strips on American Government for college classes has been released by Text-Film Department, McGraw-Hill Book Company, 330 West 42nd St., New York

(Continued on next page)

NEWS NOTES

(Continued from previous page)

18, N. Y. Following an established practice, these visual aids are correlated with two widely used college textbooks, *The American System of Government* and *The American Federal Government*. These film strips offer basic information in an interesting, easy-to-comprehend manner on the following subjects: the Constitution, the federal system, political parties and elections, Congress, office and powers of the President, federal court system, public administration and civil service, federal finance and foreign relations. The series, in whole or in part, is available through direct purchase from the McGraw-Hill Book Company, New York.

♦ To interpret the problems of young people to adults who work with them, Science Research Associates, 228 So. Wabash Ave., Chicago 4, Ill., will begin publication of a new monthly series in September. Similar in format to the Life Adjustment Series which the company will continue to publish for adolescent readership, the new series will be called the SRA Better Living Booklets and will be designed to help teachers, counselors, and parents build better relationships with young people.

Each issue in the series will be a 48-page illustrated booklet treating a major problem which adults face in helping children and adolescents.

♦ The third edition of Anne M. Boyd's indispensable reference guide, *United States Government Publications*, revised by Rae Elizabeth Rips, has just been issued by the H. W. Wilson Company (627 pp., $6.50, The H. W. Wilson Company, New York 52, N. Y.).

♦ A recent test has shown the practical value of high school driver education by disclosing the fact that 1100 young drivers who received this training were involved in only 25 per cent of the accidents attributed to a random sampling of 1100 teen agers who had not had driver education in high school.

To prive the concrete benefits of driver education courses now being offered in over 7000 high schools throughout the country, a survey was made in Delaware among 2200 teen-age drivers, half of whom had been trained and the other half of whom had not. The results of the survey follow:

	Trained	*Untrained*
Arrests	5.2%	24.9%
Accidents	5.1%	22.9%
Warnings	9.2%	31%

♦ Recognizing the increasing demand for professional education in technical drawing, Illinois Institute of Technology will begin a program this summer, leading to a bachelor of science degree in technical drawing.

In doing so, it becomes the first college or university to offer a formal degree-granting program in this specialized field.

The curriculum has been designed to provide a foundation in engineering fundamentals and professional training in the fields of technical drawing and education. It is designed to meet state certification requirements for teachers.

It will include advanced courses in mechanisms, machine design, architectural drafting, industrial design, production illustration, structural drafting, topographic drafting, and advanced descriptive geometry.

Basic courses will include economics, mathematics, chemistry, English, physics, psychology, and fundamental drafting.

♦ New courses in shop training and vocational agriculture have been added to the curriculum of the joint consolidated school district, comprising Everett, Pa., and five surrounding townships.

♦ The Carboloy Co. Inc., Detroit 32, Mich., has made a course specifically designed for educational institutions, covering the design, selection, use and maintenance of cemented carbide tools. This course is available to schools without charge, except for slide films which are available at approximate print cost, and can be used as a supplement to present courses.

♦ Timber Engineering Co., 1319 18th St. N.W., Washington 6, D. C., have prepared wood study kits which provide a specimen of each important commercial species of wood produced in the United States, together with a manual describing the species, a knife that will permit you to cut smooth surfaces on the samples, and a special hand lens to examine the exposed wood structure.

Each kit, neatly packaged in an 8½ by 7½ by 6-in. wood box, contains 54 wood and wood products specimens size ⅜ by 2¼ by 5 in. The 84-page manual describes the uses and properties of each species. It is illustrated with 51 magnified cross sections and gives directions for identifying the various woods. With the wood carving knife you can cut smooth surfaces on the ends of the samples for study with the specially made Teco 10 power hand lens.

Technologists, students, and others who want to know more about wood will find the kits take care of a long, unfilled need.

The price per kit is $8.50 delivered.

♦ A broad program for the development of a universal language for electrical quantities has been realized with the adoption of new letter symbols described in the new edition of the American Standard Letter Symbols for Electrical Quantities, just published by the American Standards Association. These symbols, adopted on the recommendation of a committee representing 36 important scientific, technical, educational, and governmental groups in the U. S., are in excellent agreement with the symbols published by the International Electrotechnical Commission for international use, and also with

(Continued on next page)

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Tables are 5" longer than most others, for the accurate jointing of 25% to 50% longer stock, and the fence is 33" long (10" longer than most others). The ONLY fence that is 100% rigid. The only 6-inch jointer with quick acting fence locks at BOTH ends. The 2¾" diameter cutterhead has a 3" diameter cutting arc, the largest in any low-priced 6-inch jointer, for freer cutting "rake-angle" to knives, for a chatterless and much smoother shearing cut rather than the chipping and chattering cut common to smaller diameter cutterheads. Cutterhead and bearings will withstand speeds up to 5500 r.p.m. Dual fence controls BOTH at operator's fingertips. Floor cabinet has motor compartment and dust chute. Four models, belt or direct motor drive, bench or floor type. Overall length: 43½". Tables: 6" wide x 36" long. Fence: 33" long x 3⅜" high. Max. width of cut: 6". Depth of cut, max.: 9/16". Cutterhead: 2¾" dia. 3 knives.

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NEWS NOTES

(Continued from previous page)

American Standard symbols for physics, mathematics, and for the radio sciences.

Copies of the American Standard Letter Symbols for Electrical Quantities, Z10.5–1949 are available from the American Standards Associations, 70 East 45 Street, or from the American Institute of Electrical Engineers, 33 West 39 Street, New York, N. Y., at 60 cents per copy. Copies for editorial review purposes may be obtained free of charge on request.

♦ Formal dedication of the $1,150,000 addition to Hagerty Hall on the Ohio State University campus has been set for Saturday, June 3. Hagerty Hall is the home of this college.

♦ "School Buildings Your Tax Dollars Can Afford," is an excellent dissertation on one-story school buildings built of wood frame construction. It is published by the Timber Engineering Co., 1319 — 18th St. N.W., Washington 6, D. C.

♦ A series of six silent film strips on photographic darkroom procedures has been announced by the McGraw-Hill Book Co., Text-Film Department, 330 West 42nd St., New York City. By means of close-up, clear photographs, each with a brief explanatory caption, these film strips demonstrate step-by-step procedures in basic operations of developing negatives and making prints. They are ideal for group instruction such as in schools, colleges and clubs, or they can be used effectively by individuals interested in getting off to a good start in photography by themselves.

For further information address the firm mentioned.

♦ The dedication of the industrial-arts section of the new Practical Arts Building, Ball State Teachers College, Muncie, Ind., took place on April 22, 1950.

♦ Sessions of the General Motors Institute for auto-mechanics teachers has been announced for June 26–July 21, and July 24–August 18. There is a $40 tuition fee. Interested instructors may write Registrar, General Motors Institute, Flint 2, Mich.

♦ A booklet under the title, "Adapting War Surplus to Educational Use," is available from the Veterans Educational Facilities Program, Federal Security Agency, Washington 25, D. C.

♦ A shop building 100 by 195 ft., is under construction in Liberal, Kans. Supt. N. B. Mahuron states that the program in the completed building will include auto mechanics, metalworking, electricity, printing, and vocational agriculture. It is to be a one-story structure.

♦ A new vocational school will be erected in Alton, Ill. The cost of the project will be borne by the Olin Industries, Alton, Ill.

New Publications

Bedroom Furniture — Period and Modern

By V. E. Broadbent. Cloth, 122 pp., 9 by 11¾ in., illus., $4. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

A book on bedroom furniture that can be made in the school shop by the average student of woodworking. There are 17 different beds described, besides bedside and dressing tables, chests of drawers, wardrobes, vanities and vanity benches, dressers, and cedar and other types of chests.

There also is a chapter on the safe use of woodworking machinery, and one on wood finishing.

Direct Current Motor Manual

By H. S. Dusenbery. Cloth, 275 pp., 5⅝ by 8½ in., illus., $3.50. The Macmillan Company, New York City.

This manual is intended for those who have to select, install, operate, and do maintenance work on d.c. motor and control equipment.

Besides presenting the basic principles of the d.c. motor, the parts such as armature, bearings, brushes, etc., are described and the various installation and maintenance problems are discussed. Series, shunt, and compound motor are then explained, as are also testing procedures, motor starting and stopping, reversing direction of rotation, speed control, and code requirements.

The appendix contains tables of useful information and a glossary.

Jewelry, Gem Cutting and Metalcraft

By William T. Baxter. Cloth, 334 pp., 5¾ by 8¼ in., illus., $4. Whittlesey House, McGraw-Hill Book Co., Inc., 330 West 42nd St., New York City.

This is a revised and enlarged edition. Its first chapter gives directions on how to make a variety of metalcraft objects.

Then there is a chapter on jewelry making, and this is followed by directions on where to find gem stone material, how to cut it to size, grind, shape it, and give it the final polish.

The identification of gem stones and minerals also is discussed.

Home Mechanics for the General Shop

By Carl J. Schaefer. Cloth, 148 pp., 6⅛ by 9⅛ in., illus., $1.60. The Bruce Publishing Company, 400 North Broadway, Milwaukee 1, Wis.

A concentrated dose of fine information for the school shop and for the home craftsman.

The directions given are clear and to the point, and the whole is well illustrated with zinc etchings.

The problem section presents information on

(Continued on page 26A)

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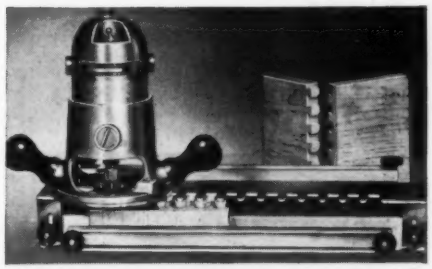

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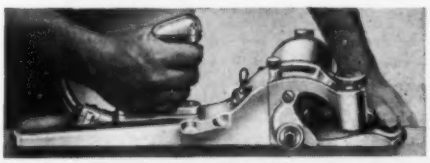

J3 POWER PLANE. The ½ h.p. motor spinning the patented spiral cutter at 18,000 r.p.m. leaves a smooth, waveless surface even against the grain. Won't splinter out ends. Simple depth of cut adjustment. Easily converted into versatile small planing mill by substituting shaper cutters for spiral cutter. Or into weatherstrip groover by substituting weatherstrip cutter.

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Kansas City, Kansas — Packers Station

NEW PUBLICATIONS

(Continued from page 24A)

tools, materials, and procedure. It also describes how to make repairs and replacements on windows, plumbing and electrical installments, furniture, etc.

The book also presents a study section, embracing such items as doors and windows, storm windows and screens, plaster patching, wallpaper, floors, hot-water systems, toilets, roofs, concrete and mortar, and insulation.

The book also contains a bibliography, and some questions on the text matter have been added at the end of each chapter.

Engineering Reports

By Lisle A. Rose, Burney B. Bennett, and Elmer F. Heater. Cloth, 341 pp., 6⅜ by 9½ in., $3. Harper & Brothers, Publishers, New York City.

A book which is intended for use by engineering students and by practicing engineers in learning effective methods of writing reports. It is much more, however, than merely a textbook in English for the engineering world, for its counsel can be applied in many other phases of business to the betterment of report making in general.

The book is divided into six divisions, in which collecting the data, and presenting it most effectively in written and oral reports are discussed. One of the divisions also presents directions for writing articles on technical subjects.

Essentials of Electricity for Radio and Television

By Morris Slurzberg and William Osterheld. Cloth, 533 pp., 6¼ by 9¼ in., illus., $4. McGraw-Hill Book Co., Inc., New York City.

This second edition has been expanded to take in the essentials of frequency modulation, television, and high fidelity and high frequency circuits.

The authors of this book have had many years of experience in teaching electricity to students, amateurs, and men in the armed forces. They have purposely written the book so that the mathematics involved can be understood by those who have mastered only the elementary groundwork of arithmetic.

The book contains hundreds of questions and problems, and many illustrative examples fully worked out so that the reader can see just how to work out the problems which he encounters.

Industrial Inspection Methods

By Leno C. Michelon. Cloth, 566 pp., 6⅛ by 9½ in., illus., $6. Harper & Brothers, Publishers, New York City.

A textbook for engineering students on a subject which has assumed an increasingly important position in the manufacturing field during and since World War II.

The book presents the basic concepts of inspection, shows how dimensional inspection is applied and how the physical and mechanical properties are inspected, discusses superficial inspection methods, and how the inspection department can be organized.

The appendix contains a bibliography of catalogs and bulletins on testing and on testing apparatus; also a list of motion pictures, a number of mathematical tables useful in inspection work, and a table of SAE standard specifications for steel.

Service Areas for Vocational Schools

Published by the American Vocational Association, Inc., 1010 Vermont Ave. N.W., Washington 5, D. C. Paper, 36 pp., 6 by 9 in., 25 cents.

This booklet was prepared by the committee on Research and Publications of the American Vocational Association.

In it are described the purpose of the area program where this type of program is needed, how it can be organized, financed, and administered. Required housing equipment and types of programs also are discussed.

Studies in Industrial Education

AVA Bulletin No. 4, 1949. Published by the American Vocational Association, Inc., 1010 Vermont Ave. N.W., Washington 5, D. C. Paper, 160 pp., 6 by 9 in., $1.

This is a bibliography of studies in industrial education prepared by a committee of the National Association of Industrial Teacher Trainers. The booklet also has a classified index.

What Employers Want (Life Adjustment Series)

By James C. Worthy. Paper, 55 pp., 5½ by 8½ in., 60 cents. Science Research Associates, Chicago, Ill.

In this booklet a sympathetic boss discusses the employer as an individual, what the employer looks for in an employee, how to succeed on the job, how to prepare for executive positions. He also describes the mental and emotional attitudes that help a man work successfully under responsibility.

An instructor's guide is available.

Woodwork Visualized

By Ross C. Cramlet. Paper, 158 pp., 8½ by 10⅝ in., $2.50. The Bruce Publishing Company, 400 N. Broadway, Milwaukee 1, Wis.

A text for the industrial-arts teacher which relies on excellently made illustrations, rather than on words, in teaching procedures and processes to students of woodwork. The illustrations are self-explanatory and they cover lumber and tools used for cutting, laying out work, boring, holding, driving, and scraping. Tool sharpening, joinery, fastenings, hardware, and finishing are described also by full-page illustrations which will greatly simplify the job of teaching woodwork. There are also 23 "how to" projects presented in the form of full-page illustrations.

This is a book which will please both teacher and student.

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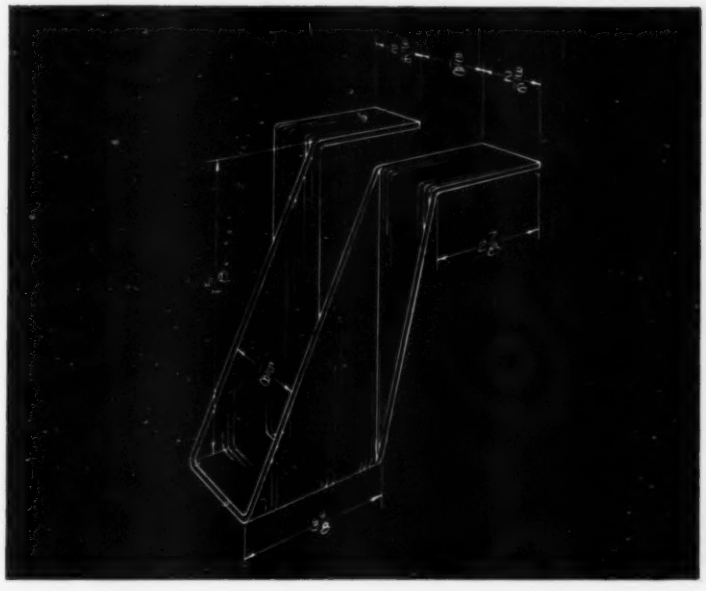

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5. APPLIED DRAWING AND SKETCHING: Fleming-Berich-Smith ($2.00)
6. STRENGTH OF MATERIALS: Harris ($4.90)
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8. MATHEMATICS FOR INDUSTRY: Rusinoff ($5.50)
9. HOW TO TALK MORE EFFECTIVELY: Bordeaux ($2.75)
10. CARBIDE CUTTING TOOLS: Baker-Kozacka ($5.50)
11. FUNDAMENTALS OF CARPENTRY: Durbahn (Vol. I, $3.25; Vol. II, $4.25)
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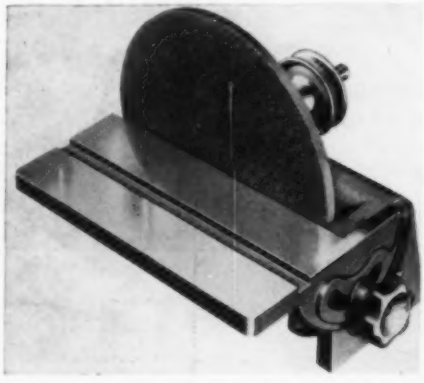
Shop Equipment News

NEW PRODUCTS — PUBLICATIONS

THE DELTA HOMECRAFT DISK SANDER

A new Delta Homecraft 8½-in. disk sander has been placed on the market by the Power Tool Division of the Rockwell Manufacturing Company, 600 East Vienna Ave., Milwaukee 1, Wis.



8½-in. disk sander

It is stanchly built, and will handle any straight, angular, curved, or convex surface of wood, plastic, ivory, or nonferrous metal. It can bevel edges, square ends, and round corners, and is ideal for such tasks as freehand sanding and compound angle sanding.

The table of this new Delta Homecraft disk sander can be tilted as much as 45 deg., away from the disk, and as much as 30 deg., toward the disk. A precision miter gauge, obtainable at a small additional cost, turns 45 deg. right and left. Both table and miter gauge have easy-to-read scales.

For brief reference use IAVE — 0601.

HAND FEED TURNSTILE BED TURRET

The South Bend Lathe Works is now producing a hand feed turnstile operated bed turret as an accessory for their 16-in swing lathes. This bed turret is so designed that it can be accurately fitted by the user to the inside bed ways of any 16-in. swing South Bend lathe. This makes possible the economical production of duplicate precision parts, but does not change the basic lathe in any way. The turret can be removed at any time and the tailstock remounted for regular lathe work.

Specifications of the South Bend Hand Feed Turnstile Bed Turret are: effective feed of the turret slide 6⅛ in.; distance from center of turret tool holes to top of slide 2½ in.; head to be bored by user to take six standard turret tools with 1½-in. diameter shanks; distance between opposite turret faces is 9⅜ in. When properly installed, the turret head will index to within plus or minus .0005 in., measured 4 in. from turret face. This accuracy is assured by a superfinished index pin fitted to a lapped steel bushing.

For additional information write to South Bend Lathe Works, South Bend 22, Ind.

For brief reference use IAVE — 0602.

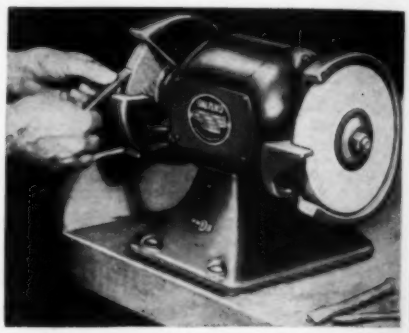
Hand feed turnstile bed turret

MODEL 562 SKIL BENCH GRINDER

A new line of bench grinders, featuring extra-large work clearance, has just been announced by Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill.

These grinders permit easy handling of large and bulky pieces, and allow more accessibility to grind wheels, thus offering a wider range for swinging large, long, and odd-shaped objects.

Skil ¼- and ⅓-h.p. grinders are "flat-faced" to provide full clearance for difficult jobs. Skil ½- and 1-h.p. grinders have compact motors which also give the worker more room for grinding bulky objects.



Model 562 Skil bench grinder

These grinders have large, permanently lubricated ball bearings. Skil ¼- and ⅓-h.p. grinders have split phase motors for quick starting and smooth running. Skil ½- and 1-h.p. grinders have low starting current type motors, which withstand extra heavy duty service. All motors are totally enclosed for protection from metal or abrasive particles.

Heavy duty cast wheel guards give full protection in grinding and wire brushing and can be easily removed for buffing and polishing. Tool rests can also be removed for wire brushing or buffing and are quickly adjustable for grinding wheel wear.

For brief reference use IAVE — 0603.

LONG STROKE HY-DRAULIC OPENSIDE SHAPERS

Because of demands for longer than 36-in. stroke lengths, the Rockford Machine Tool Company, Rockford, Ill., are introducing this machine in additional stroke lengths of 48, 60, and 72 in.

On these machines with longer table lengths, the driving motor is mounted to the side of the bed directly behind the column, thereby saving floor space over the 36-in. machine, with the motor mounted upon the rear of the bed.

The work capacity of this line of Rockford Hy-Draulic Openside Shapers will now accommodate work pieces 24 in. high, 30 in. wide, and lengths of 36, 48, 60, and 72 in.

The worktable is of box-section, supported by a double-length bed. The column has a heavy

(Continued on page 30A)

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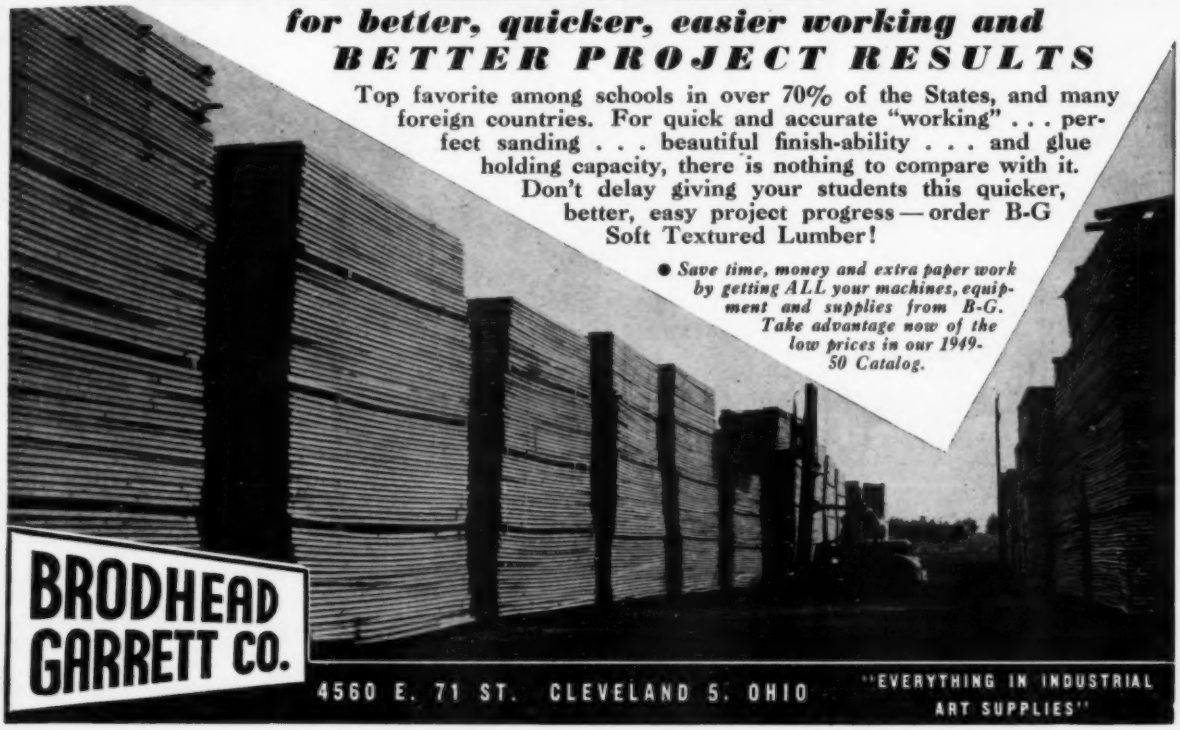

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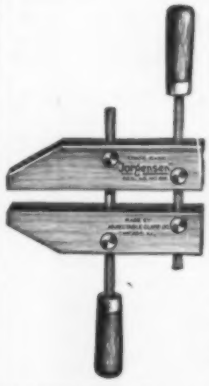

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Free 52-page Manual on request.

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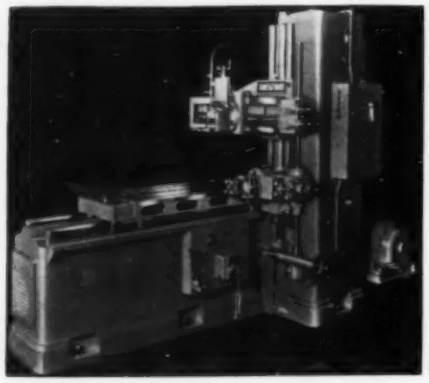
SHOP EQUIPMENT NEWS

(Continued from page 28A)

cross section and supports an adjustable cross-rail anchored to the column by a triangular rail brace.

Rockford Hy-Draulic drive and feeds provide a continuous range of cutting speed and feed changes. The absence of gears and racks provides



Long stroke Hy-Draulic openside shapers

a smooth, uninterrupted finish to the work. Because the few moving parts, subject to wear, are submerged in oil, wear is at a minimum.

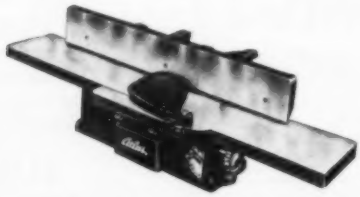
The Hy-Draulic drive provides quick reversals and fast table returns, and the cushion effect of oil pressures increases the life of the cutting tools.

For brief reference use IAVE — 0604.

NEW ATLAS 6-IN. JOINTER-PLANER

The new Atlas 6000 Jointer-Planer embodies several exclusive features that assure accuracy, safety, economy, and efficiency.

The rear bearing cap on this jointer is readily removable so the entire head can be quickly taken out and the blades resharpened without disturbing their setting. Once the head is replaced, the blades position simultaneously.



Atlas 6-in. jointer-planer

Other outstanding features includes: 42-in. precision ground gray-iron table, 32 by 4½-in. two-way tilting fence, stationary rear table for greater accuracy, sealed-for-life ball bearings, heavy 2¾-in. diameter solid steel cutter head, depth of rabbet scale, 12-in. wide rear table for greater ease in handling wide boards, and extra-heavy construction throughout.

The jointer cuts 6 in. wide, ½ in. deep. It requires ½ or ⅓ h.p., 3450 r.p.m. motor.

For illustrated catalog write to the Atlas Press Co., 26032 N. Pitcher St., Kalamazoo, Mich.

For brief reference use IAVE — 0605.

MEDIUM-WEIGHT DRILLING MACHINE

A new medium-weight, 25-in. swing drilling machine has just been introduced by Sibley Machine & Foundry Corp., South Bend, Ind. Known as the Model E-25, the new 765-lb. weight drilling machine fills the gap between

(Continued on page 32A)

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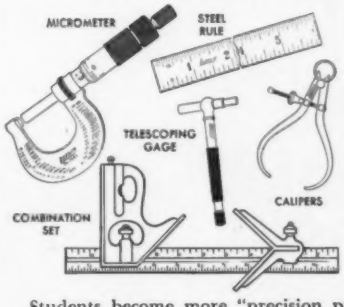

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SHOP EQUIPMENT NEWS

(Continued from page 30A)

the larger heavier type and the light bench class.

Model E-25 has a variable speed drive from which the exact spindle speed may be obtained for any size drill from ⅛ to 1 in. It has an extra large rectangular 18 by 26-in. table with coolant trough.

It is powered by 1½-h.p. axial air gap type motor. Its rated capacity is ¾ in. in steel, and 1 in. in cast iron.

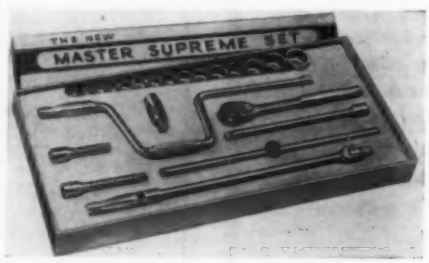
Five options of spindle speeds each with a 4 to 1 ratio are available, ranging from a low of 206–825 r.p.m., to a high of 540–2160 r.p.m., with 3-phase 60-cycle motor. A speed chart on the side of machine shows proper speeds for different drill sizes.

For full information on the Sibley Model E-25, write for Catalog No. 69 to Sibley Machine & Foundry Corp., South Bend, Ind., mentioning this magazine.

For brief reference use IAVE — 0606.

SNAP-ON MASTER SUPREME SET

Snap-on Tools Corp., Kenosha, Wis., announces a new ½-in. square drive socket wrench set with every unit redesigned to give greater working efficiency and stylized appearance. Known as the "Master Supreme Set," it consists of 15 double



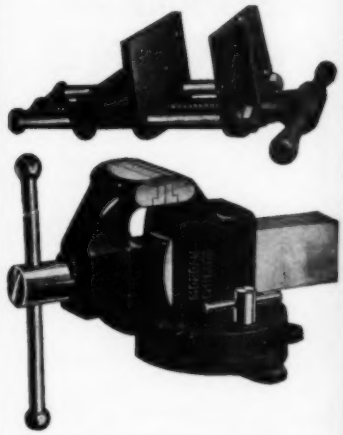
Snap-on Master Supreme set

hexagon sockets ranging in size from 7/16 to 1¼ in., a 10-in. "Master Supreme" ratchet, 18-in. nut spinner, 15-in. sliding bar, 18¾-in. speeder, universal joint, and 3½-, 5-, and 10-in. extension bars.

The sockets feature a lock groove in each of the four sides of the drive hole to grip the friction ball on the square drive of the handle. This

(Continued on page 34A)

MORGAN VISES



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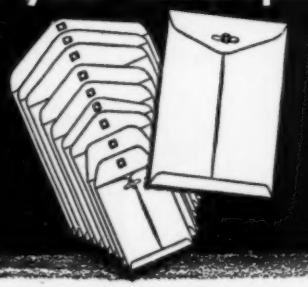

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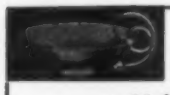

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SHOP EQUIPMENT NEWS

(Continued from page 32A)

four-way grip contributes convenience and speed when interchanging units. Large, easy-to-read numbers and sizes are stamped clearly on each socket. Handles have been restyled to incorporate Snap-on's new style "Palm-Grip."

All units in the set are heavily chrome plated for lasting appearance.

For brief reference use IAVE — 0607.

FLEXIBILITY WITH POWER TOOLS

Almost a year ago, the Magna Engineering Corp., 417 Montgomery St., San Francisco 4, Calif., began a study of the place which Shopsmith, a multi-purpose power tool, might occupy in the fields of industrial arts and vocational education. The firm sought the assistance of leading educators to help it determine the ways in which their equipment might be applied to the needs of the school shop.

Dr. Heber A. Sotzin, director of the division of industrial arts at San Jose State College, assisted in this study, and he has been kind enough to let us distribute the pamphlet which contains his thoughts on the Shopsmith.

According to his opinion this new power tool makes possible more efficient utilization of shop facilities and a reduction in the amount of student time wasted while waiting for a particular power tool work station. It may also lead to significant changes in teaching technique.

A copy of the pamphlet by Dr. Sotzin will be sent to anyone who requests it. Copies of the catalog describing the Shopsmith also are available.

For brief reference use IAVE — 0608.

SEBASTIAN GEARED-HEAD LATHE

American Steel Foundries, King Machine Tool Division, Cincinnati 29, Ohio, have just published two catalogs illustrating the Sebastian Lathes, which they manufacture.

Catalog S-1 describes the standard type "R" 12-, 16-, and 20-in. geared lathes.

Catalog S-101 gives a description of the special type "R" 12-, 16-, and 20-in. lathes, including gap, clutch and brake, metric screw, line shaft drive, and bed turret lathes.

Both of these catalogs furnish complete specifications of the lathes which they describe.

For brief reference use IAVE — 0609.

CATALOG OF STEEL TAPES, LEVELS, AND TRANSITS

The L. S. Starrett Co., Athol, Mass., has just published a new catalog of precision steel tapes, levels, transits, other measuring tools for engineers, surveyors, mechanics, draftsmen, and contractors.

Copies of the catalog are available without cost.

For brief reference use IAVE — 0610.

HOW TO RUN A LATHE

The South Bend Lathe Works, South Bend 22, Ind., has just announced the publication of the 49th edition of this well-known booklet, the first edition of which was put out in 1907.

For brief reference use IAVE — 0611.

INSTRUCTORS SEND FOR NEW No. 20 CATALOG OF **RED DEVIL TOOLS**
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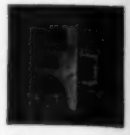

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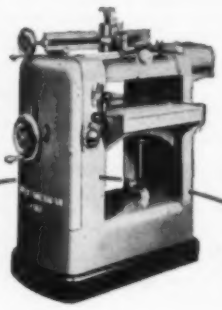
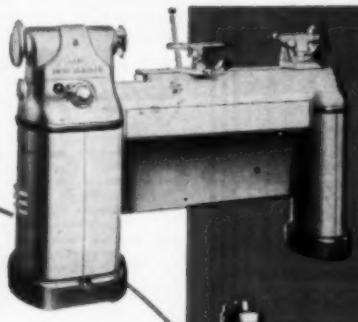
Direct motor driven, 5 hp. motor. Vee-belt variable feed. 15 to 45 f.p.m. Top infeed roll is sectional. Flexible chipbreaker. Four knife round safety cutterhead. Cast-iron base and frame.





J-170
12" LATHE
Variable speed drive provides 700 to 3200 r.p.m. Available for wood turning, metal spinning or both. 35" bed. 31" between centers. Swing, 13"; 14½" over gap.

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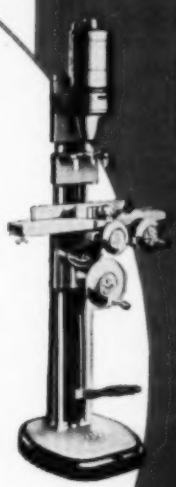
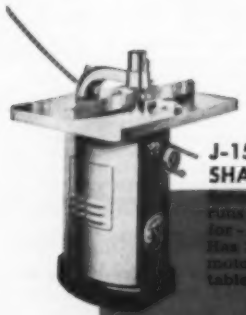
The completely new Yates-American J-Line machines are as modern in design as they are attractive in appearance. They are ideal for school shops because of their sturdiness, safety and simplicity. Examine them — note the many design features that make them outstanding in their size and capacity range. Write for more information and for the name of your distributor.

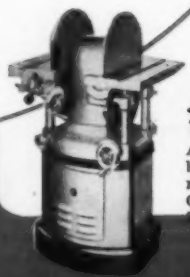


J-140
MORTISER
Direct motor driven. Foot-operated ram. Compound table—30" x 6". Has 11¾" lateral movement, 4" cross adjustment, 18" vertical adjustment.

J-120
20"
BAND SAW
Wheels 40" dia., 1⅛" face. Wheel speed 875 r.p.m., blade travel 4500 f.p.m. Table 34" x 34", tilts 60° right and 15° left. Stock: widest, 18½", opening under guide, 12½". 3 hp. motor, vee-belt drive.



J-150
SHAPER
[illegible] runs 10,000 r.p.m. on lubricated-for-life precision ball bearings. Has 3" vertical adjustment. 2 hp. motor, vee-belt drive. 20" x 28" table.



J-14[illegible]
16" DISC SANDER
Avail[illegible]s with single or double disc. Vee-belt drive. ¾ hp. motor with double disc machine, ½ hp. motor with single disc. Counterbalanced table, 8½" x 30¾". Tilts [illegible]° up and 45° down.

J-145
SPINDLE SANDER
Oscillates ½", 90 times per minute. Detachable spindle, coupled directly to ½ hp. motor. Table 20" x 24" tilts [illegible]° left and 10° right.

J-131
8" JOINTER
Three knife round cutterhead is driven at 4200 r.p.m. by vee belts from ¾ hp. motor. Table 50" long. Steel fence, 5" high, 38" long, tilts 45°. Universal aluminum guard.

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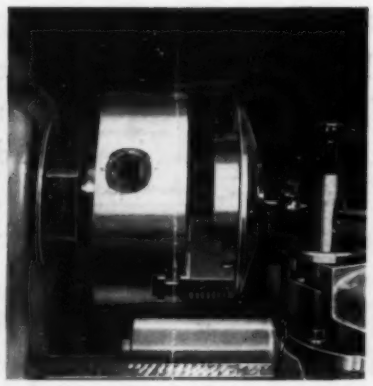
"turning tips for trainees"

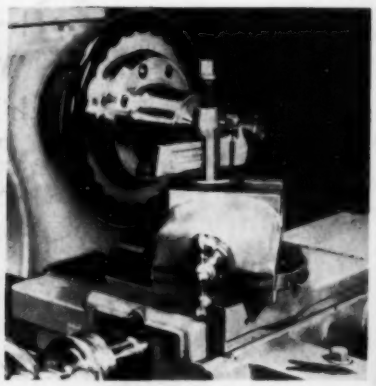
BY OLD-TIMER FRANK FETTER, 42 YEARS WITH LEBLOND

The three operations below are fairly common, and most lathe hands figure they know all there is to know about them. They're not particularly difficult, but I've seen some good men go wrong on these points.

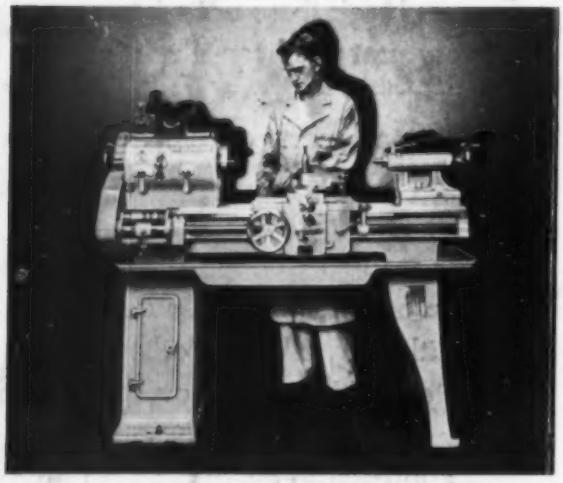
1. FACING SHAFTS. Use a tailstock center that has been grooved or flatground on the taper. Caution: Be sure flat surface is less than half way through point, or it will act as a reamer. For the finishing skim cut, start at center hole and cut toward outside diameter



2. CHUCKING JOBS. Be sure chuck is tight on the spindle nose and that all jaws grip the work. Take the thrust of a heavy cut on a jaw step, chuck body or back-up block. But fasten the back-up block to the chuck. Set tool so jaws will not hit compound.



3. THREAD CUTTING. Use speeds under 50 rpm. Set feed levers on quick change box for thread desired. Set compound on 30° toward tailstock. Grind tool to a thread gauge and set tool point to lathe center height. Use thread gauge to set tool square with center line of work. Engage chasing dial in leadscrew. Place apron feed handle in neutral.



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